taylor products
Division of Magnum Systems

Taylor Products
VN Series
Gravity Fill Bagging Scale

Operation and Maintenance Manual

Taylor Products
a division of Magnum Systems
2205 Jothi Avenue
Parsons, Kansas 67357-8460
Toll Free: 888-882-9567
Phone: 620-421-5550
Fax: 620-421-5531

Web: www.taylorproducts.com
customerservice@magnumsystems.com

Machine Serial Number: _____

Sales Order Number: _____

Important Information

Conventions

Safety Alert Symbols

The ⚠ symbol indicates that important personal safety information follows. Carefully read this text for the warnings information it contains. The signal word next to each safety alert symbol is defined as:

	WARNING	*Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.*
	CAUTION	Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury, or damage to the equipment. This single word may also be used to identify unsafe practices.
	LOCKOUT	This symbol will be used anytime that a procedure requires an electrical lockout.

Static Sensitive Symbols for Equipment Handling Instructions

The and symbols indicate important handling guidelines for proper handling of electronic equipment modules and sensitive components for the prevention of potential damage that could be caused by ESD (electrostatic discharge) during routine maintenance, handling and transportation.

	ESD NOTICE	To protect against ESD damage to electronic equipment, follow the Standard ESD Prevention Procedures. Failure to use protective measures could result in permanent equipment damage, either immediate or latent, when handling modules.
	ESD NOTICE	To protect against ESD damage to electronic equipment containing components, follow the Standard ESD Prevention Procedures. Failure to use recommended protective measures could result in permanent equipment damage, either immediate or latent, when handling components.

Standard Electro-static Discharge (ESD) Prevention Procedures

The VN Series Electronic Small Packer utilizes many electronic components that are susceptible to damage from Electro Static Discharge. Anytime electronic components are serviced, the following precautions should be followed:

1. Wear a commercial grounding wrist strap.
2. Remove power from the machine.
3. Leave all static sensitive components in their protective packaging until it is time to install the component
4. Always hold static sensitive components by their metal mounting tabs, and/or by their edges

Important/Notable Information

While all of the information in this manual is important, there are some pieces of information where special attention needs to be paid to avoid equipment damage, or specific information needs to be emphasized. This information will be handled as follows:

> ***Important:*** *Indicates an operating procedure, practice, or condition that, if not strictly followed, may cause equipment damage.*
>
> ***Note:*** *Indicates additional information or emphasizes a topic related to the subject being discussed.*

Personal Safety Instructions

Only qualified personnel should work on or around this equipment. To ensure the highest degree of personal safety, all who use this equipment are required to become thoroughly familiar with all safety instructions contained in this document. Successful and safe operation of this equipment depends upon proper handling, operation, maintenance, and application of associated equipment. Refer to Appendix A of this manual for all safety instructions. Safety instructions are also provided where they apply within the body of this manual.

WARNING

No information in this manual supersedes or replaces your employer's operating rules. If there is a difference in instructions between this manual and the employer's operating rules, follow the most restrictive instruction.

Deliberate misuse or abuse of electronic components may cause personal injury or death.

Warranty Information

Seller warrants that the Products will operate substantially in conformance with Seller's published specifications, when subjected to normal, proper and intended usage by properly trained personnel, for a period of one (1) year from the date of shipment to Buyer (the "Warranty Period"). Seller agrees during the Warranty Period, provided it is promptly notified in writing upon the discovery of any defect and further provided that all costs of returning the defective Products to Seller are pre-paid by Buyer, to repair or replace, at Seller's option, defective Products so as to cause the same to operate in substantial conformance with said specifications. Replacement parts may be new or refurbished, at the election of Seller. All replaced parts shall become the property of Seller. Replacement Parts will be billed at list price, unless they are approved as warranty replacement item(s) by the service technician and the technical services manager.

Lamps, fuses, bulbs and other expendable items are expressly excluded from the warranty. Seller's sole liability with respect to equipment, materials, parts or software furnished to Seller by third party suppliers shall be limited to the assignment by Seller to Buyer of any such third party supplier's warranty, to the extent the same is assignable. In no event shall Seller have any obligation to make repairs, replacements or corrections required, in whole or in part, as the result of (i) normal wear and tear, (ii) accident, disaster or event of force majeure, (iii) misuse, fault or negligence of or by Buyer, (iv) use of the Products in a manner for which they were not designed, (v) causes external to the Products such as, but not limited to, power failure or electrical power surges, (vi) improper storage of the Products or (vii) use of the Products in combination with equipment or software not supplied by Seller. If Seller determines that Products for which Buyer has requested warranty services are not covered by the warranty hereunder, Buyer shall pay or reimburse Seller for all costs of investigating and responding to such request at Seller's then prevailing time and materials rates. If Seller provides repair services or replacement parts that are not covered by the warranty, the Buyer shall pay Seller therefore at Seller's then prevailing time and materials rates. ANY INSTALLATION, MAINTENANCE, REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL, OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY SELLER, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCTS.

Field Service

Taylor Products can provide field service for start-up assistance, training, maintenance, and replacement/spare parts for new and existing equipment. Contact Taylor Products at (888) 882-9567.

This Page Intentionally Left Blank

VN Series
Table of Contents

Chapter **Page**

1 Product Description 1-1
1.1 General Description 1-1
1.2 Introduction 1-1
1.3 Manual Scope 1-1
1.4 Electrical Requirements 1-1
1.5 Pneumatic Requirements 1-1
1.5.1 Pneumatic Lubrication Requirements 1-1
1.6 Major Systems and Components 1-2
1.6.1 Cabinet Assembly 1-3
1.6.2 Vibratory Feeder 1-4
1.6.2.1 Flow Gate 1-5
1.6.2.2 Cutoff Gate 1-5
1.6.3 Load Cells 1-5
1.6.4 Weigh Bucket Assembly 1-6
1.6.4.1 Dump Gates 1-7
1.6.4.2 Dump Gate Cylinders 1-8
1.6.5 Spout Assembly 1-8
1.6.6 Bag Clamp 1-8
1.6.6.1 Standard V-Type Bag Clamps 1-8
1.6.6.2 Optional Inflatable Bladder Bag Clamp 1-9
1.6.6 Bag Clamp Actuator Switches 1-9
1.6.7 Bag In Place Switch 1-10
1.6.8 Spout Transition 1-10
1.6.9 MAC Valves 1-11
1.6.10 Filter/Regulator/Lubricator (FRL) Assembly 1-11
1.6.11 Machine Controls 1-12
1.6.11.1 Standard Control Box With T4000 Control Panel 1-12
1.6.11.2 Standard Electronic Control Components 1-14
1.6.11.3 Control Box With Optional T3000 Control Panel 1-15
1.6.11.4 Optional T3000 Electronic Control Components 1-17
2 Receiving Equipment 2-1
2.1 General Description 2-1
2.2 Uncrating the Equipment 2-1

3 Setup/Installation 3-1
3.1 General Description 3-1
3.2 Mechanical Setup 3-1
3.2.1 Determining The Height Of The VN Series Feeder System 3-1
3.2.2 Determining Hopper Size 3-1
3.2.3 Mounting the VN Series 3-2
3.3 Making Electrical Connections 3-4
3.4 Making Pneumatic Connections 3-5
3.4.1 Pneumatic Component Lubrication Requirements 3-5
3.5 Making Network Connections (T3000 Only) 3-5
3.6 Establishing Security Settings 3-6
3.6.1 T4000 Security Settings 3-6
3.6.2 T3000 Security Settings 3-9
3.7 Dry Cycle 3-10
3.8 Calibration 3-10
3.8.1 Calibrating the T4000 Controller 3-10
3.8.2 Calibrating the Optional T3000 Controller 3-13
3.9 Timer and Counter Programming 3-15
4 Operation 4-1
4.1 General Description 4-1
4.2 General Fill Cycle Information 4-1
4.2.1 Basic Fill Process 4-2
4.2.2 Typical Fill Cycle 4-2
4.2.2.1 Filling the Weigh Bucket 4-2
4.2.2.2 Putting a Bag on the Bag Spout 4-3
4.2.2.3 Filling the Bag 4-3
4.3 Operational Controls 4-4
4.3.1 Mechanical Controls 4-4
4.3.2 Electrical Controls 4-4
4.3.2.1 Control Box with T4000 Control Panel 4-4
4.3.2.2 Control Box With T3000 Control Panel 4-6
4.3.3 Allen-Bradley MicroLogix™ 1000 4-7
4.3.4 PV300 Control Panel 4-7
4.3.4.1 PV300 Menus 4-8
4.4 Initial Setup 4-9
4.4.1 Setting Up a VN Series With T4000 Controls to Fill 4-9
4.4.2 Setting Up a VN Series With T3000 Controls to Fill 4-9
4.4.2.1 Selecting Preprogrammed Products 4-9
4.4.2.2 Using the T3000 to Set Up A Product From Scratch 4-10
4.5 Starting the Unit 4-11

5 Preventive Maintenance 5-1
5.1 General Description 5-1
5.2 Daily Maintenance Procedures 5-1
5.2.1 Cleaning 5-1
5.2.2 Check Calibration 5-1
5.3 Monthly Maintenance 5-1
6 Troubleshooting 6-1
6.1 General Description 6-1
6.2 The Troubleshooting Process 6-1
6.3 Trouble Symptoms 6-1
6.3.1 Scale is Not Accurate 6-1
6.3.2 Scale Does Not Return to Zero 6-2
6.3.3 The Cutoff Gate Does Not Open 6-2
6.3.4 Weighments are Erratic 6-2
6.3.5 Machine Fails To Start After The STOP Button Is Pulled Out 6-2
6.3.6 Bag Clamp Won't Apply 6-3
6.3.7 Bag Clamp Won't Release 6-3
6.3.8 Bag Clamp Applies, But Doesn't Stay Applied 6-3
6.3.9 Load Cell Fails Frequently 6-3
6.3.10 Fill speeds are too slow 6-3
6.4 System Alarms 6-4
6.4.1 T4000 Alarms 6-4
6.4.2 T3000 Alarms 6-5
6.4.2.1 Fill Alarms 6-5
6.4.2.2 Jog Alarms 6-5
6.4.2.3 Filler Discharge Alarms 6-5
7 Preventive Maintenance 7-1
7.1 General Description 7-1
7.2 System Adjustments 7-1
7.2.1 Air Pressure Adjustments 7-1
7.2.2 Cutoff Gate Adjustment 7-2
7.2.2.1 Adjusting The Cylinder Rod End 7-2
7.2.2.2 Adjusting The Cylinder Mount 7-2
7.2.3 Adjusting Air Flow 7-3
7.2.4 Adjusting the Flow Gate 7-3
7.3 System Repairs 7-4
7.3.1 Load Cell Replacement 7-4
7.3.1.1 Load Cell Removal 7-4
7.3.1.2 Load Cell Installation 7-5

7.3.2 Dump Gate Cylinder Replacement 7-5
7.3.2.1 Dump Gate Cylinder Removal 7-5
7.3.2.2 Dump Gate Cylinder Installation 7-6
7.3.3 Dump Gate Replacement 7-6
7.3.3.1 Dump Gate Removal 7-6
7.3.3.2 Dump Gate Installation 7-7
7.3.4 Bag Clamp Pad (V-Type Bag Clamp) Replacement 7-8
7.3.4.1 Bag Clamp Pad (V-Type Bag Clamp) Removal 7-8
7.3.4.2 Bag Clamp Pad (V-Type Bag Clamp) Installation 7-8
7.3.5 Bag Clamp (V-Type Bag Clamp) Cylinder Replacement 7-8
7.3.5.1 Bag Clamp Cylinder (V-Type Bag Clamp) Removal 7-8
7.3.5.2 Bag Clamp Cylinder (V-Type Bag Clamp) Installation 7-9
7.3.6 Bag Clamp Pad Mount (V-Type Bag Clamp) Replacement 7-9
7.3.6.1 Bag Clamp Pad Mount (V-Type Bag Clamp) Removal 7-9
7.3.6.2 Bag Clamp Pad Mount (V-Type Bag Clamp) Installation 7-10
7.3.7 Bag Clamp Arm (V-Type Bag Clamp) Replacement 7-10
7.3.7.1 Bag Clamp Arm (V-Type Bag Clamp) Removal 7-10
7.3.7.2 Bag Clamp Arm (V-Type Bag Clamp) Installation 7-11
7.3.8 Bag Clamp Arm Bearing (V-Type Bag Clamp) Replacement 7-11
7.3.8.1 Bag Clamp Arm Bearing (V-Type Bag Clamp) Removal 7-11
7.3.8.2 Bag Clamp Arm Bearing (V-Type Bag Clamp) Installation 7-12
7.3.9 Spout (V-Type Bag Clamp) Replacement 7-12
7.3.9.1 Spout (V-Type Bag Clamp) Removal 7-12
7.3.9.2 Spout (V-Type Bag Clamp) Installation 7-13
7.3.10 Inflatable Bladder Replacement 7-13
7.3.10.1 Inflatable Bladder Removal 7-13
7.3.10.2 Inflatable Bladder Installation 7-15
7.3.11 MAC Valve Replacement 7-17
7.3.11.1 MAC Valve Removal 7-17
7.3.11.2 MAC Valve Installation 7-17
7.3.12 Bag Clamp Actuator Switch Replacement 7-18
7.3.12.1 Bag Clamp Actuator Switch Removal 7-18
7.3.12.2 Bag Clamp Actuator Switch Installation 7-18
7.3.13 Bag In Place Switch Replacement 7-19
7.3.13.1 Bag In Place Switch Removal 7-19
7.3.13.2 Bag In Place Switch Installation 7-19
7.3.14 Pneumatic Quick Connect Fitting Replacement 7-20
7.3.14.1 Pneumatic Quick Connect Fitting Removal 7-20
7.3.14.2 Pneumatic Quick Connect Fitting Installation 7-20
7.3.15 T3000 Interface Card Replacement 7-21
7.3.15.1 T3000 Interface Card Removal 7-21
7.3.15.2 T3000 Interface Card Installation 7-21

7.3.16 Harding Summing Board Replacement 7-21
7.3.16.1 Harding Summing Board Removal 7-21
7.3.16.2 Harding Summing Board Installation 7-22
Glossary Glossary-1
Index Index-1
Appendix A Safety Procedures, Cautions, Warnings, and Notices A-1
Appendix B Spare Parts B-1
Appendix C Mechanical Drawings C-1
Appendix D Electrical Drawings D-1
Appendix E Control Panel User Guide E-1
Appendix F Custom Features F-1

This Page Intentionally Left Blank

List of Figures

Figure **Page**

Figure 1-1. Side View of VN Series (showing internal components) 1-2
Figure 1-2. VN Series Cabinet 1-3
Figure 1-3. Vibratory Feeder 1-4
Figure 1-4. Side View of Vibratory Feeder 1-4
Figure 1-5. Load Cell (1 of 2 shown) 1-5
Figure 1-6. Weigh Bucket 1-6
Figure 1-7. Dump Gates (Closed) 1-7
Figure 1-8. Dump Gates (Open) 1-7
Figure 1-9. V-Type Bag Clamp and Cylinder 1-8
Figure 1-10. Spout With Inflatable Bag Clamp 1-9
Figure 1-11. Bag Clamp Actuator and Bag In Place Switches 1-9
Figure 1-12. Spout transition and Related Components 1-10
Figure 1-13. MAC Valve Arrangement 1-11
Figure 1-14. Filter/Regulator/Lubricator (FRL) Assembly 1-11
Figure 1-15. Control Box With T4000 Controls 1-13
Figure 1-16. Standard T4000 Electronic Control Components 1-14
Figure 1-17. Control Box With T3000 Control Panel 1-16
Figure 1-18. Optional T3000 Electronic Control Components 1-17
Figure 2-1. Typical Shell Crate 2-1
Figure 3-1. Calculating Fill Height 3-1
Figure 3-2. Supply Hopper Mounting Surface – Top View of VN Series 3-2
Figure 3-3. VN Series Cabinet Mounting Points 3-3
Figure 3-4. Shipping Nuts/Shims 3-4
Figure 3-5. Lubricator – Oil Flow Control 3-5
Figure 3-6. Placing The Cursor In Front Of Security 3-6
Figure 3-7. Placing The Cursor In Front Of Set Password 3-6
Figure 3-8. Set Password Menu 3-7
Figure 3-9. Password Set To 123 3-7
Figure 3-10. Verify Password 3-7
Figure 3-11. SECUR Menu Item Shown Above Function button 3-8
Figure 3-12. Parameter Shown Locked 3-8
Figure 3-13. Placing the Cursor In Front Of Calibration 3-11
Figure 3-14. Placing The Cursor In Front Of Trad Cal 3-11
Figure 3-15. Placing The Cursor In Front Of Zero Value 3-11
Figure 3-16. Span Value Displayed 3-12
Figure 3-17. Calibration Line 3-14
Figure 3-18. Selecting TRAD Calibration 3-14
Figure 3-19. Checking Zero Value 3-14
Figure 3-20. Setting Span Value 3-14
Figure 4-21. Programmable Logic Controller (PLC) 3-15
Figure 4-1. Fill Rates (DSP) 4-1
Figure 4-2. T4000 Faceplate 4-4

Figure 4-3. Standard Control Box With T4000 Control Box 4-5
Figure 4-4. T3000 Faceplate Layout 4-6
Figure 4-5. Control Box With T3000 Control Panel 4-6
Figure 4-6. Programmable Logic Controller (PLC) 4-7
Figure 4-7. Allen-Bradley PV300 Control Panel 4-7
Figure 7-1. Air Pressure Adjustment 7-1
Figure 7-2. Cutoff Gate Cylinder and Mount 7-2
Figure 7-3. Air Flow Adjustment Knobs 7-3
Figure 7-4. Flow Gate Adjustment Mechanism 7-3
Figure 7-5. Load Cell (1 of 2 shown) 7-4
Figure 7-6. Dump Gate Cylinders 7-6
Figure 7-7. Dump Gate Components 7-7
Figure 7-8. Bag Clamp Pad Mounting 7-8
Figure 7-9. Bag Clamp Cylinder (1 of 2 shown) 7-9
Figure 7-10. Bag Clamp Pad Arm 7-10
Figure 7-11. Spout Components – Exploded View 7-11
Figure 7-12. Spout Mounting Bolts 7-13
Figure 7-13. Section View of Open Mouth Bag Spout and Inflatable Bladder 7-14
Figure 7-14. Inflatable Bladder Compression Ring 7-14
Figure 7-15. Creating the Flap 7-16
Figure 7-16. Pulling the Bladder Up, and Creating the Upper Flap 7-16
Figure 7-17. MAC Valve Solenoid Mounting Screws 7-17
Figure 7-18. MAC Valve (Solenoid Removed) 7-18
Figure 7-19. Bag In Place Switch 7-19
Figure 7-20. Air Supply Fitting 7-20

List of Tables

Table **Page**
Table 4-1. PV300 Main Menu 4-8
Table 4-2. PV300 Timer Menu #1 4-8
Table 4-3. PV300 Timer Menu #2 4-8
Table B-1. VN Series Spare Parts List B-1
Table C-1. VN Series Mechanical Drawings C-1
Table D-1. VN Series Electrical Drawings D-1

This Page Intentionally Left Blank

Chapter 1
Product Description

1.1 General Description
This chapter provides a high-level product description of the VN Series.

1.2 Introduction
The Taylor Products VN Series is an electronic net weigh scale that is capable of filling up to 12 bags per minute. The VN Series is designed to fill packages ranging in weight from 15 to 125 lbs. (7 to 55 kg.).

The VN Series comes standard with a painted finish, but can be ordered with 304 stainless steel product contact parts.

1.3 Manual Scope
This manual will provide information on installation, operation, preventive maintenance, troubleshooting, and repair of the VN Series.

The appendices include safety information, spare parts list, and mechanical drawings.

1.4 Electrical Requirements
The VN Series is designed to operate on 115 VAC (60 Hz) at 20 Full Load Amps (FLA).

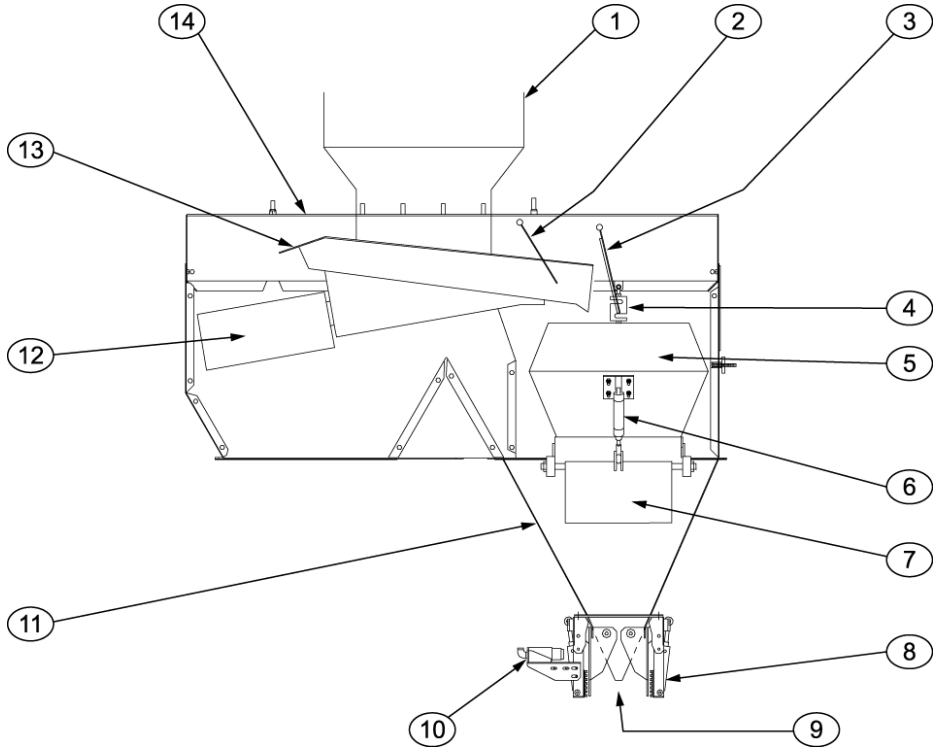
1.5 Pneumatic Requirements
The VN Series uses approximately 2-4 CFM (57-113 liters) @ 80-125 PSI (.55-.86 MPa) of compressed air. Taylor Products recommends that the air supply line be equipped with a refrigerated air dryer, or at the very least a water separator.

1.5.1 Pneumatic Lubrication Requirements
The pneumatic cylinders require lubrication to ensure their proper operation and to extend their useful life. The lubricator should be filled with 10 weight, non-detergent oil. The oil flow control knob, located on top of the lubricator, should be set so that the lubricator is delivering 1 drop of oil for every 50 fill cycles.

1.6 Major Systems and Components

When working with the VN Series, it is important to understand the major systems and components of the unit. The major components of the system are:

- Cabinet
- Vibratory feeder with feeder pan
- Load cells
- Weigh bucket assembly
- Spout
- Bag clamp assembly
- Bag in place switch
- Bag clamp actuator switch
- Spout transition
- MAC valves
- Filter/Regulator/Lubricator
- Machine controls



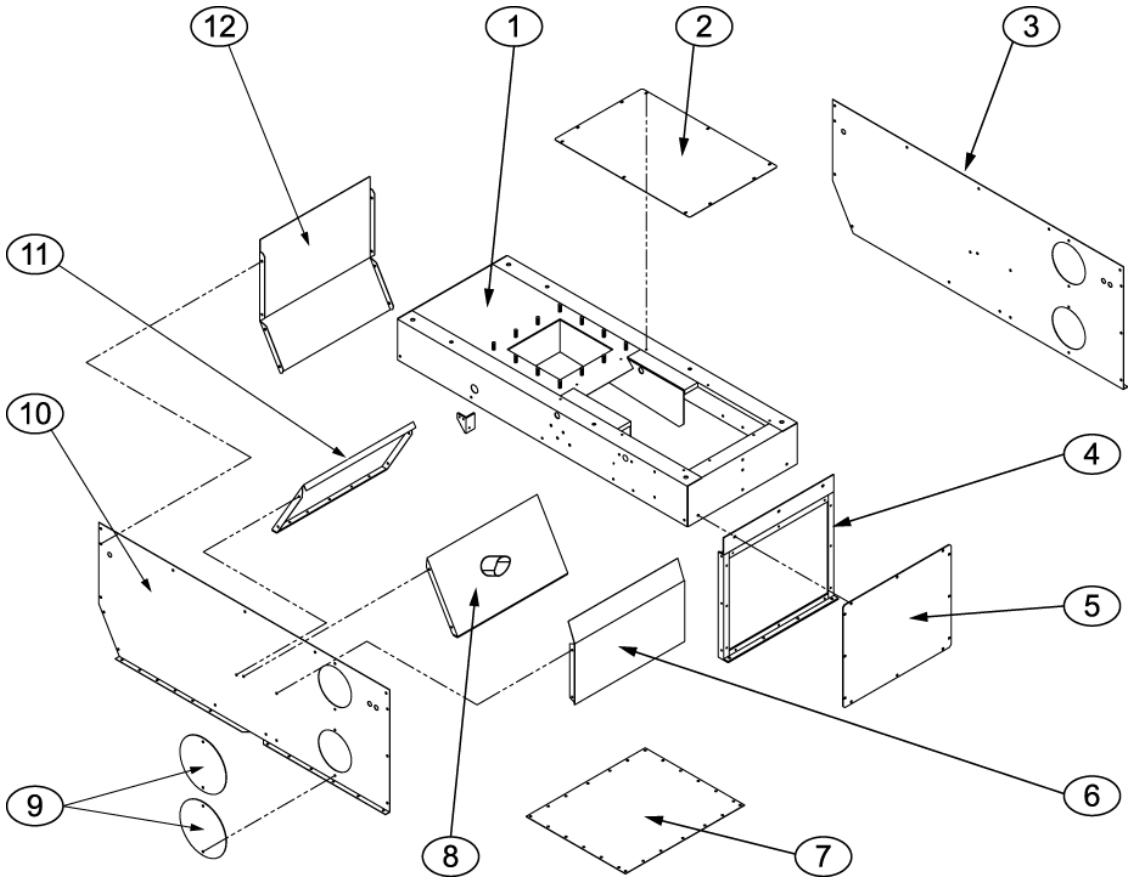
Item #	Description	Item #	Description
1	Supply hopper (plant supplied)	8	Bag clamp
2	Flow gate	9	Spout
3	Cutoff gate	10	Bag clamp actuator switch
4	Load cell	11	Spout transition
5	Weigh bucket	12	Vibrator
6	Dump gate cylinder	13	Feeder pan
7	Dump gate	14	Cabinet

Figure 1-1. Side View of VN Series (showing internal components)

1.6.1 Cabinet Assembly

The cabinet is the backbone of the VN Series. It serves as the mounting point for all other VN Series sub-assemblies. The cabinet consists of a base frame, and six panels that are fastened to the base frame and each other with machine screws, lock washers, and nuts.

The base frame provides the mounting points for all of the other components that make up the VN Series. The other panels are used to protect components from external interference/damage and to help contain any dust from the packaging process.



Item #	Description	Item #	Description
1	Base frame	7	Cabinet bottom panel
2	Cabinet top panel	8	Dust panel with dust collection port
3	Cabinet side panel	9	Access covers
4	Cabinet front panel support	10	Cabinet side panel
5	Cabinet front panel	11	Dust panel
6	Dust shield	12	Cabinet rear panel

Figure 1-2. VN Series Cabinet

1.6.2 Vibratory Feeder

The vibratory feeder uses vibration to move the material from the surge hopper to the weigh bucket. The surge hopper is positioned above the rear of the vibratory feeder. Product flows out of the surge hopper into the pan of the feeder. Vibration moves the product down the pan and into the weigh bucket.

The rate of vibration (speed/frequency) determines the fill rate. The PLC and the vibrator control module control the fill rate.

Because the weighing mechanism on the VN Series can be affected by vibration, the vibratory feeder is attached to the cabinet and suspended using springs. The springs absorb the vibration created by the vibratory feeder.

Important: *The feeder pan on the vibratory feeder is set to a 6° downward angle at the factory.*

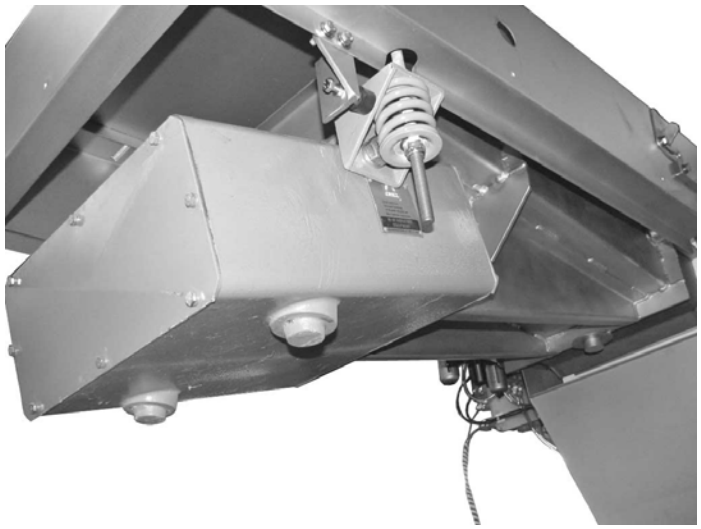


Figure 1-3. Vibratory Feeder

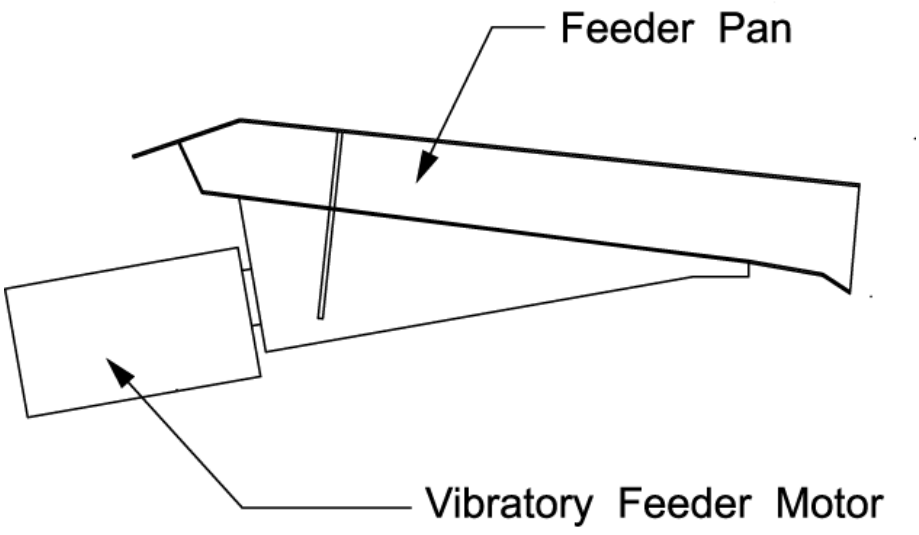


Figure 1-4. Side View of Vibratory Feeder

1.6.2.1 Flow Gate

Inside the VN Series cabinet is the flow gate. The purpose of the flow gate is to control the amount (depth in the pan) of product flowing down the feeder pan. The adjustment of the flow gate is achieved using a mechanical adjustment mechanism on the side of the VN Series cabinet. The position of the flow gate does not change throughout the fill cycle.

1.6.2.2 Cutoff Gate

Because the feeder pan is open on the end, a cutoff gate must be used to prevent additional product from falling into the weigh bucket after the vibratory feeder has turned off. The gate is opened and closed by a pneumatic cylinder. The pneumatic cylinder receives its compressed air supply via a MAC valve, which is controlled by the PLC.

1.6.3 Load Cells

The weigh bucket assembly is suspended from the cabinet by two load cells. The load cells are used to sense the weight of the material in the weigh bucket. As product is loaded into the weigh bucket, the additional weight causes the voltage output from each load cell to increase. The output from the load cells is supplied to the control enclosure. The load cell cables are connected to the back of the controller. In both cases, the two load cell inputs are balanced to create one reading for the product weight.

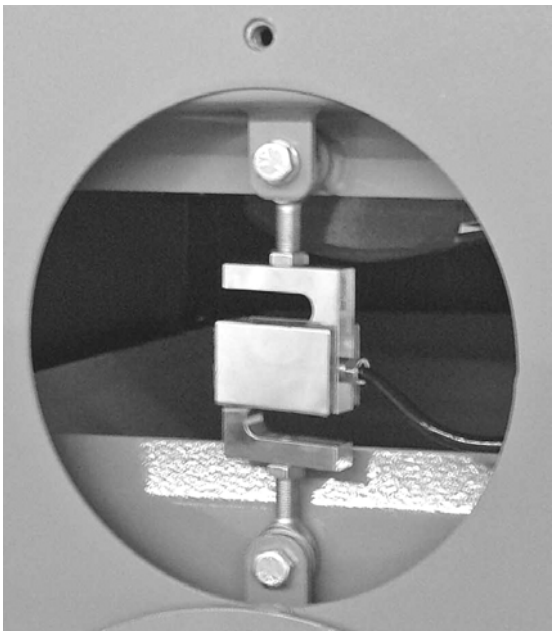


Figure 1-5. Load Cell (1 of 2 shown)

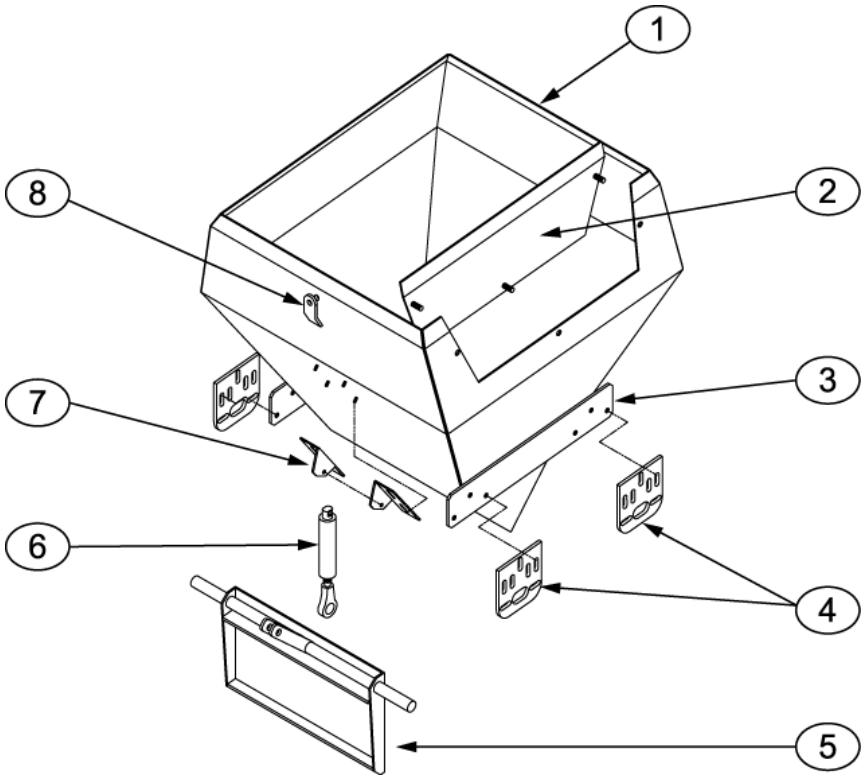
CAUTION A sudden jerk or shock, such as being struck by a tool or hitting the weigh bucket etc., can cause load cell damage. The load cell is NOT covered by warranty.

1.6.4 Weigh Bucket Assembly

The VN Series is a net-weigh machine. This means that the product is loaded into a vessel to be weighed, prior to being placed into the package. The weigh bucket assembly is the vessel used for weighing the product. The weigh bucket assembly hangs from two load cells. The weigh bucket assembly consists of the following items:

- Weigh bucket
- Weigh bucket access panel
- Dump gates
- Dump gate mounts
- Dump gate pivot plates
- Dump gate cylinders
- Dump gate cylinder mounts
- Dump gate bearings

At the top of the weigh bucket is an access panel that allows the operator to check the inside of the weigh bucket.

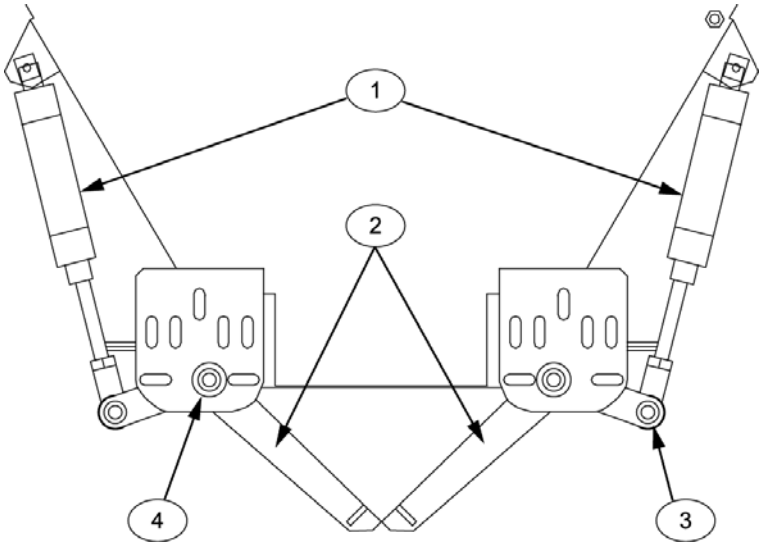


Item #	Description	Item #	Description
1	Weigh bucket	5	Dump gate (1 of 2 shown)
2	Weigh bucket access panel	6	Dump gate cylinder (1 of 2 shown)
3	Dump gate mount (1 of 2 shown)	7	Dump gate cylinder mounts (2 of 4 shown)
4	Dump gate pivot plates (2 of 4 shown)	8	Load cell mount (1 of 2 shown)

Figure 1-6. Weigh Bucket

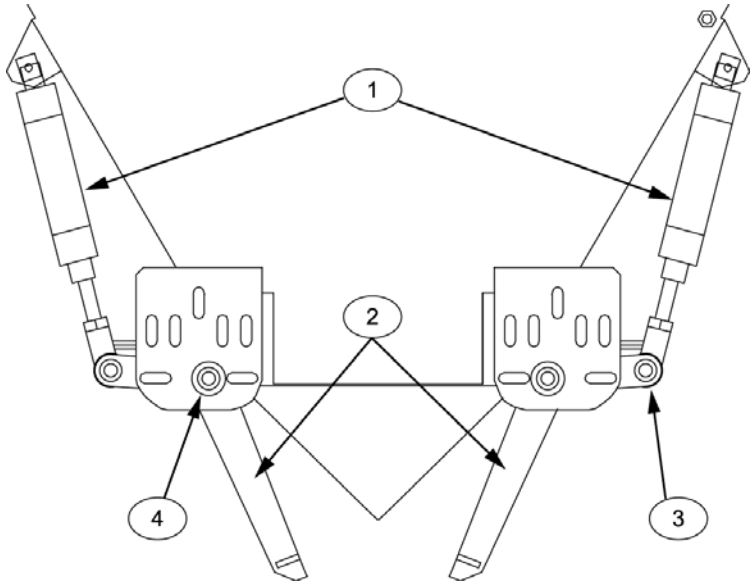
1.6.4.1 Dump Gates

Located at the bottom of the weigh bucket assembly is a pair of dump gates. The product is weighed prior to being placed in the package. Once the weight of the product in the weigh bucket assembly reaches the cutoff point and the product is no longer flowing into the weigh bucket assembly, the dump gate cylinders will retract to open the dump gates. This will allow the product to fall through the spout into the package.



Item #	Description	Item #	Description
1	Dump gate cylinders	3	Dump gate lever
2	Dump gates	4	Dump gate pivot bearing

Figure 1-7. Dump Gates (Closed)



Item #	Description	Item #	Description
1	Dump gate cylinders	3	Dump gate lever
2	Dump gates	4	Dump gate pivot bearing

Figure 1-8. Dump Gates (Open)

1.6.4.2 Dump Gate Cylinders

The dump gates are opened and closed using pneumatic cylinders. The two cylinders are controlled by one MAC valve. The MAC valve has two pneumatic outputs. One is to extend the cylinders, and the other is to retract the cylinders. Each output is split in two through the use of a T-fitting. Each branch off of the T-fitting is connected to the same port on opposite cylinders. For example, the extend output from the MAC valve splits in two at the T-fitting. One branch from the T-fitting is connected to the extend port on one dump gate cylinder, while the other branch from the T-fitting is connected to the extend port on the opposite gate cylinder. The air supply lines used for each branch are the same length. This makes it possible to keep the cylinders in sync with one another. Each of the fittings on each cylinder is also equipped with a flow control valve. This allows the operator to fine tune the actuation speed of each cylinder, on both the extend stroke and the retract stroke.

1.6.5 Spout Assembly

The spout attaches to the bottom of the spout transition. The purpose of the spout is to direct the product that is dropped out of the weigh bucket into the package. The spout also serves as the mounting point for the bag clamp mechanism, the bag clamp actuator switch, and the bag in place switch.

1.6.6 Bag Clamp

The VN Series utilizes a bag clamp system to hold the bags in place while the bag is filling. The VN Series comes standard with a V-type bag clamp system, but can be ordered with an optional inflatable bladder type of bag clamp system.

1.6.6.1 Standard V-Type Bag Clamps

V-type bag clamps use a pair of pneumatic cylinders to apply and release a pair of bag clamp arms. Each bag clamp arm pivots on a set of bearings and is fitted with a bag clamp pad that is made of rubber. The bag clamp pads grip the package and hold it firmly when the product drops into the bag.

The two cylinders are controlled by one MAC valve. The MAC valve has two pneumatic outputs. One is to extend the cylinders, and the other is to retract the cylinders. Each pneumatic output is split in two, using a T-fitting. Each of the branches off of the T-fitting is connected to the same port on opposite cylinders. For example, the extend output from the MAC valve splits in two at the T-fitting. One branch from the T-fitting is connected to the extend port on one bag clamp cylinder, while the other branch from the T-fitting is connected to the extend port on the opposite bag clamp cylinder. This makes it possible to keep the cylinders in sync with one another. Each of the fittings on each cylinder is also equipped with a flow control valve. This allows the operator to fine tune the actuation speed of each cylinder, on both the extend stroke and the retract stroke.

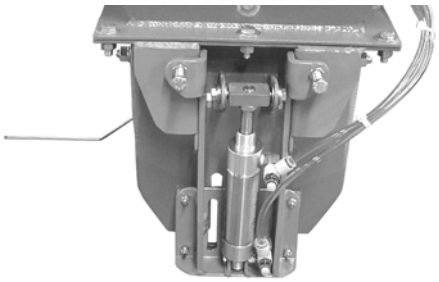
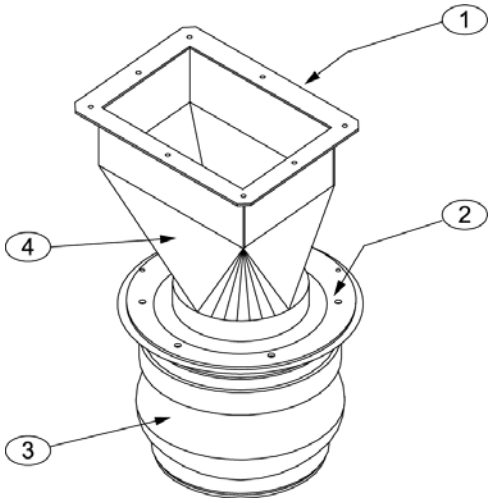


Figure 1-9. V-Type Bag Clamp and Cylinder

1.6.6.2 Optional Inflatable Bladder Bag Clamp

The optional inflatable bladder bag clamp uses an inflatable rubber bladder to hold the package in place during the fill cycle. The operator will place the package on the spout. Once the bag clamp actuator switch is tripped, compressed air will fill the bladder causing it to expand. The bladder will press outward on the inside of the bag, holding it in place. A dedicated air pressure regulator is installed in the air supply line to the inflatable bladder. The regulator should be set so that the air pressure in the bladder will not exceed 7 psi (.048 MPa). The VN Series uses a blowout switch to prevent the bladder from being overfilled. The blowout switch uses a bale connected to a rotary switch. When the bladder contacts the bale, it rotates the switch. The result is that the contacts in the switch will change state, which causes the MAC valve to change state and stop the airflow to the bag clamp.



Item #	Description	Item #	Description
1	Transition mounting flange	3	Inflatable bladder
2	Spout mounting flange	4	Transition

Figure 1-10. Spout With Inflatable Bag Clamp

1.6.7 Bag Clamp Actuator Switches

The VN Series comes equipped with a pair of bag clamp actuator switches. The switch is a rotary type switch. A wire bale is attached to the switch. When the operator places a new bag on the spout, it contacts the bale on the bag clamp actuator switch causing it to rotate the switch to start the fill cycle.

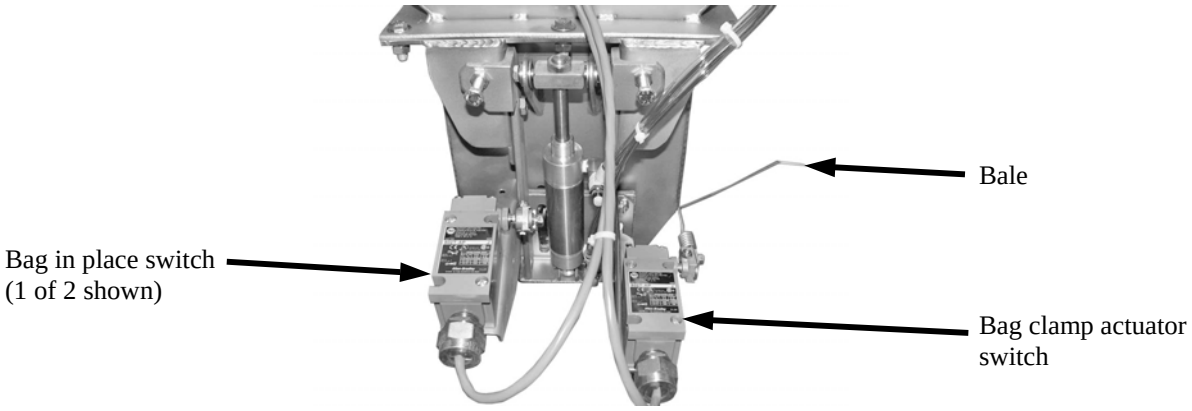


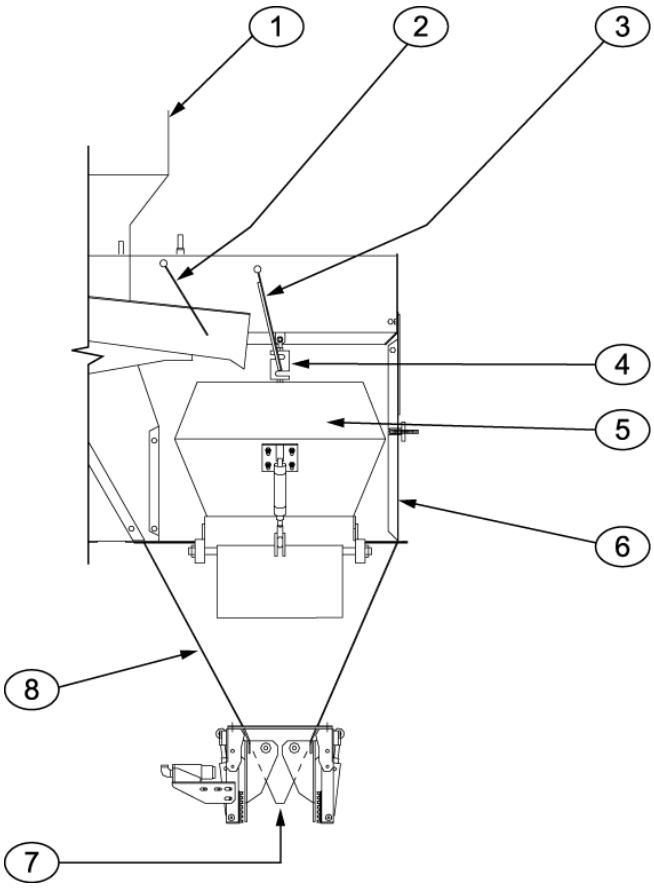
Figure 1-11. Bag Clamp Actuator and Bag In Place Switches

1.6.8 Bag In Place Switch

To prevent the fill cycle from starting without a bag being in position to receive the product, the VN Series utilizes a bag in place switch.

1.6.9 Spout Transition

In between the VN Series cabinet and the spout is the spout transition. When the dump gate opens to drop the product, the spout transition funnels the product to the spout, where it falls into the bag.



Item #	Description	Item #	Description
1	Supply hopper (plant supplied)	5	Weigh bucket
2	Flow gate	6	Cabinet
3	Cutoff gate	7	Spout
4	Load cell	8	Spout transition

Figure 1-12. Spout transition and Related Components

1.6.10 MAC Valves

The VN Series uses a series of MAC valves to control the flow of air to the different pneumatic components. The MAC valves are pneumatic valves that are controlled by electric solenoids. When power is applied to the solenoid, it causes the valve to change states. The MAC valves are used to control the dump gates, bag clamp cylinders, and cutoff gates.

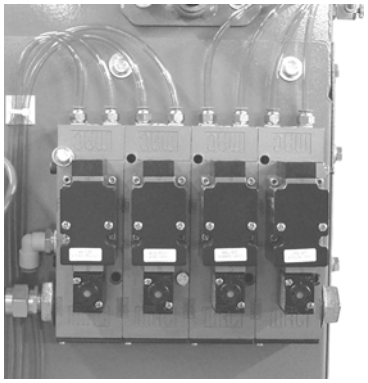


Figure 1-13. MAC Valve Arrangement

1.6.11 Filter/Regulator/Lubricator (FRL) Assembly

The VN Series is equipped with a filter/regulator/lubricator (FRL) assembly. This component is critical to the proper operation of the VN Series. The filter portion of the assembly takes the incoming compressed air and removes any moisture and debris. This is done to minimize wear and corrosion. The regulator portion allows the operator to control the operating pressure of the compressed air. Too much or too little air pressure will adversely affect the operation of the VN Series. The lubricator portion is used to meter pneumatic oil into the compressed air supply. This oil provides lubrication for the pneumatic components. The lubricator includes an adjustment knob so the operator can dial in the correct amount of oil. Too much or too little oil will adversely affect the operation of the VN Series.

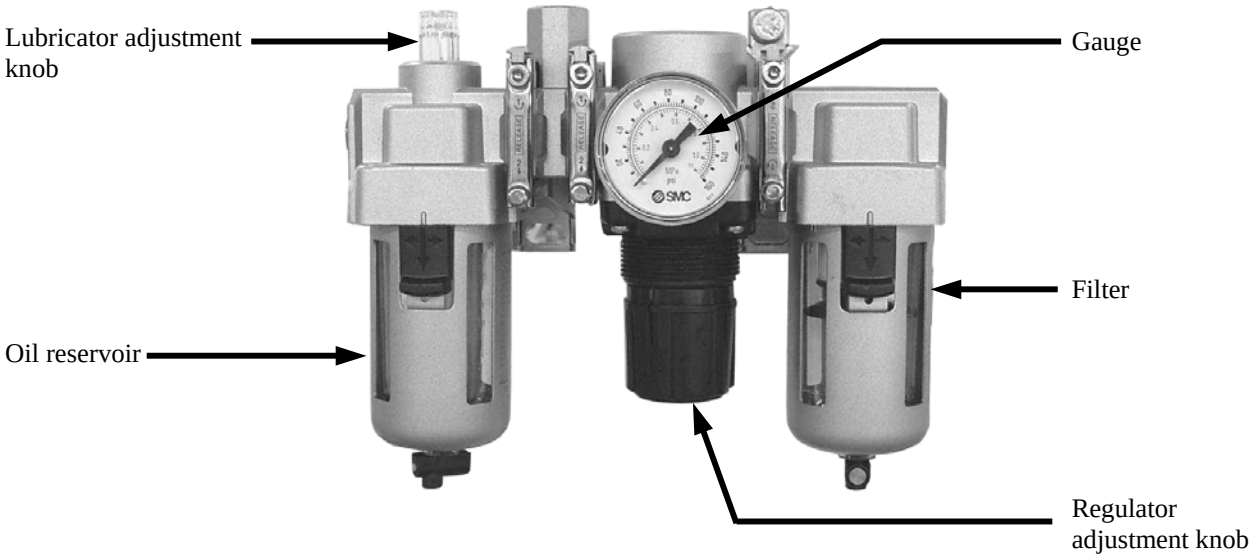


Figure 1-14. Filter/Regulator/Lubricator (FRL) Assembly

1.6.12 Machine Controls

The VN Series can be equipped with one of two types of control systems. The standard control system uses a Taylor Products/Hardy Instruments T4000 control panel. An optional control system utilizes a Taylor Products/Hardy Instruments T3000 control panel. In either case, the control box will have several control switches and indicators in addition to the control panel used. Both the T4000 and T3000 include a weigh meter and control keys.

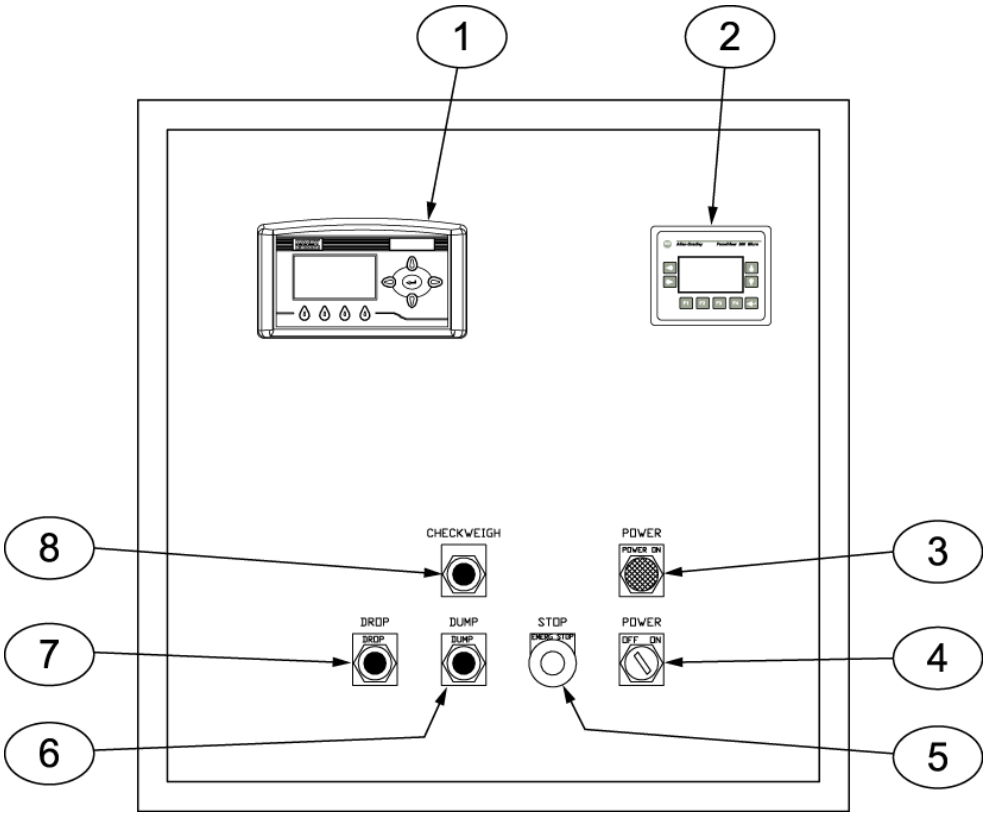
Both systems utilize a control box that will be mounted on a freestanding pedestal, with 15 feet of control cabling. The control box contains the control components that allow the VN Series to function.

1.6.12.1 Standard Control Box With T4000 Control Panel

The controls that the operator will use to start, stop, and adjust machine functions are located on the front side of the control box. The operator controls consist of the following items:

- **T4000 control panel** – Located in the upper left corner of the control panel door. The T4000 has the connections for the weigh meter and the load cells. The load cells send their voltage signal to the Harding summing board, which balances the inputs from the load cells and combines them into a single input to the T4000 to be displayed on the weigh meter.
- **PV300 control panel** – The PV300 is the operator interface to the PLC. The operator uses the PV300 to monitor and adjust system timer and counter settings.
- **DROP button** – The MANUAL DROP button allows the operator to release a bag from the spout in the event of an over/under violation.
- **DUMP button** – The MANUAL DUMP button is used to manually open the dump gates on the weigh bucket to empty any product that may be in the weigh bucket.
- **CHECKWEIGH button** –The operator would press the CHECKWEIGH button to check the current package weight at the end of the fill cycle. This is done to compare the final package weight to the target package weight.
- **POWER ON indicator** – The POWER indicator will illuminate if the POWER switch is turned to the ON position. This function is dependent on the machine being connected to its power source and that power source being in working condition.
- **POWER switch** – Located just right of center on the bottom of the control panel door, this switch is used to turn the power to the machine on and off.
- **STOP button/indicator** – The STOP button/indicator will immediately stop the machine when it is pushed in. When pushed, this button will illuminate red to indicate that the button is pushed and that machine function has been interrupted. The machine cannot be restarted until the STOP button is pulled out.

  Important: *The following graphic illustrates a typical configuration of a control box with a T4000 control panel. Some units may be different. Always refer to the engineering drawings for the specific machine being worked on to ensure that the most accurate information is used.*



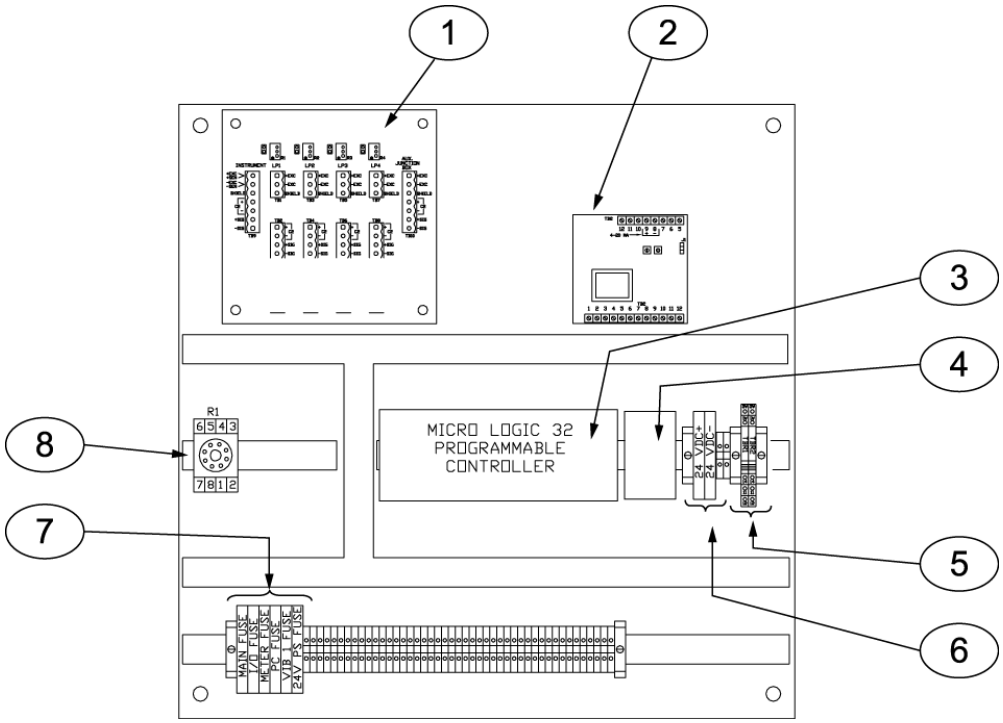
Item #	Description	Item #	Description
1	T4000 control panel	5	STOP button/indicator
2	PV300 control panel	6	DUMP button
3	POWER ON indicator	7	DROP button
4	POWER switch	8	CHECKWEIGH button

Figure 1-15. Control Box With T4000 Controls

1.6.12.2 Standard Electronic Control Components

Inside the control box are the components that actually perform the control functions for the machine. These components include the following components:

- **Hardy summing board** – The load cells are connected to the Hardy summing board. The Harding summing board processes the inputs from the load cells, balances them and combines them into a single signal input for the T4000.
- **Power supply** – The 24VDC power supply converts the incoming 115VAC power to 24VDC, which is required by the PLC.
- **Allen-Bradley MicroLogix™ 32 PLC** – Provides multiple timer and counter functions.
- **Relay boards** – Mounting points for relays.
- **Fuse holders, fuses, and terminals** – Circuit protection for the VN Series.



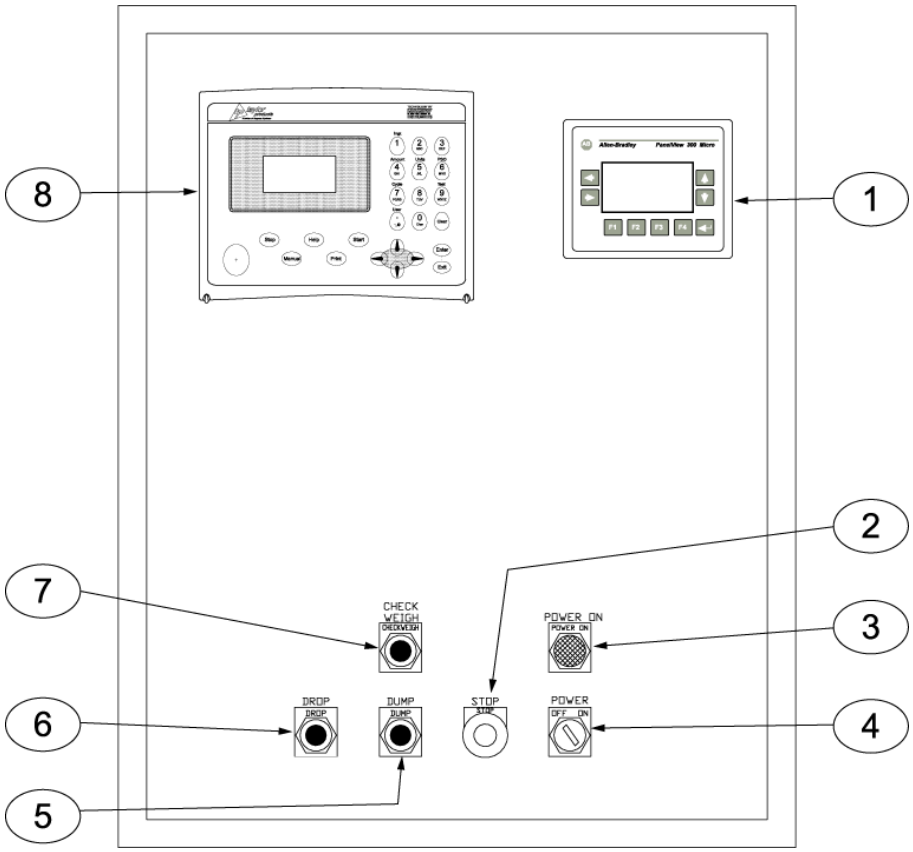
Item #	Description	Item #	Description
1	Hardy summing board	5	Terminal relays
2	Vibrator control module	6	Fuse holders
3	Programmable Logic Controller (PLC)	7	Fuse holders
4	PLC power supply	8	Relay base

Figure 1-16. Standard T4000 Electronic Control Components

1.6.12.3 Control Box With Optional T3000 Control Panel

The controls that the operator will use to start, stop, and adjust machine functions are located on the front side of the control box. The operator controls consist of the following items:

- **T3000 control panel** – Located in the upper left corner of the control box door. The T3000 has the connections for the load cells.
- **PV300 control panel** – Located to the right of the T3000 control panel. This panel is the user interface to the PLC. The operator will use it to adjust system timer and counter settings.
- **POWER indicator** – Located directly above the POWER switch. When the POWER switch is turned to the ON position, if the machine is connected to its power source, this indicator will illuminate green.
- **POWER switch** – Located in the lower right of the control box. This switch is used to turn the power to the machine on and off.
- **STOP button/indicator** – Located directly to the left of the POWER indicator is the STOP button/indicator. The STOP button/indicator will immediately stop the machine when it is pushed in. When pushed, this button will illuminate red to indicate that the button is pushed and that machine function has been interrupted.
- **DUMP button** – This button is located just to the left of the STOP button/indicator. It is used to manually open the dump gates on the weigh bucket and unload any product that may be in the weigh bucket.
- **DROP button** – Located just to the left of the DUMP button is the DROP button. This button is used to manually release the bag clamps and drop the package.
- **CHECKWEIGH button** – Located above the DUMP button, this button is pressed by the operator to hold the filled package at the end of the fill cycle so the finished package weight can be checked.



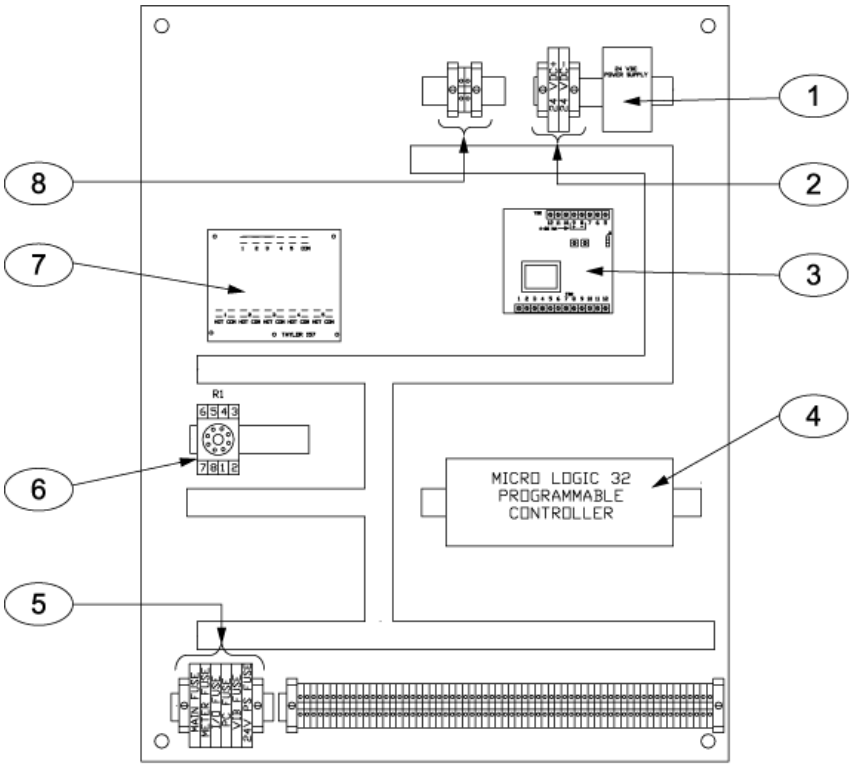
Item #	Description	Item #	Description
1	PV300 control panel	5	DUMP button
2	STOP button/indicator	6	DROP button
3	POWER indicator	7	CHECKWEIGH button
4	POWER switch	8	T3000 control panel

Figure 1-17. Control Box With T3000 Control Panel

1.6.12.4 Optional T3000 Electronic Control Components

Inside the control box are the components that actually perform the control functions for the machine. These components include the following components:

- **T3000 interface board** – The load cells and weigh meter are connected to the T3000 interface board. The T3000 interface board processes the inputs from the load cells and sends an output to the weigh meter.
- **Power supply** – The 24VDC power supply converts the incoming 115VAC power to 24VDC, which is required by the PLC.
- **Relay base** – The mounting points for the relays.
- **Allen-Bradley MicroLogix™ 32 PLC** – Provides multiple timer and counter functions.
- **Fuse holders, fuses, and terminals** – Circuit protection for the VN Series.



Item #	Description	Item #	Description
1	Power supply	5	Fuses
2	Fuses	6	Relay base
3	Vibrator control module	7	T3000 interface board
4	Allen-Bradley MicroLogix 32 PLC	8	Fuses

Figure 1-18. Optional T3000 Electronic Control Components

This Page Intentionally Left Blank

Chapter 2
Receiving Equipment

2.1 General Description

The VN Series and all of its components are thoroughly inspected before shipment. Upon receipt of the equipment, it is important that the machine be carefully inspected for shipping damage. In the event that damage is found, contact the shipping company and follow their process for reporting shipping damage.

2.2 Uncrating the Equipment

Follow the procedure below to unpack the equipment and prepare it for installation.

The VN Series is shipped in a shell crate to protect it during shipment. Follow the procedure below to unpack the equipment and prepare it for installation.

1. The VN Series should be suspended from a sturdy product hopper or framework, that is capable of supporting it without allowing it to move, or allowing vibration to interfere with its operation.
2. The VN Series requires an area that is approximately 10’ x 10’ in size. Complete any nearby construction before installing the VN Series.
3. Before removing VN Series from the shipping pallet, inspect VN Series for visible damage. Inspect for damaged or missing parts. If there is damage, notify the shipper immediately. If the unit is not damaged, proceed to the next step.
4. Remove the shell crate. Use care when unpacking the VN Series to avoid damage to any hinged parts and external control knobs.

Figure 2-1. Typical Shell Crate

5. Carefully cut the plastic shrink-wrap that is wrapped around the VN Series away and remove it.
6. Remove lag bolts from mainframe at pallet.
7. Grasp unit by the base frame to handle.
8. Remove all crating and discard.

This Page Intentionally Left Blank

Chapter 3
Setup/Installation

3.1 General Description

Only persons who have been properly trained and hold the appropriate qualifications should attempt to install, operate, or maintain this equipment.

WARNING	*Before installing, adjusting, or servicing any electrical component, be sure to become familiar with the electrical schematics for the machine.*

WARNING	*Before installing, adjusting, or servicing any pneumatic component, be sure to become familiar with the pneumatic schematics for the machine.*

3.2 Mechanical Setup

Use the following procedures to assemble the VN Series and prepare it for operation.

3.2.1 Determining The Height Of The VN Series Feeder System

When determining the height of the VN Series feeder system, the spout should be positioned at a comfortable working height. Care must be taken to include allowances for any conveyor systems, the height of the longest bags that the unit will fill, and any other factors that may affect working conditions. Typically, this is done using the following formula:

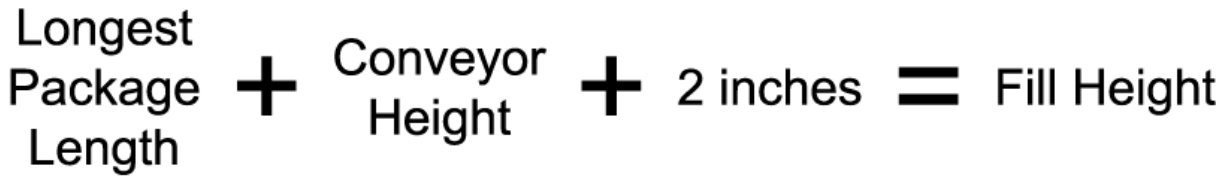


Figure 3-1. Calculating Fill Height

3.2.2 Determining Hopper Size

The customer-supplied hopper that will be feeding the VN Series should be a minimum of 30 cubic feet. The sides of the hopper should be at a sufficient angle to allow the product to flow into the top of the feeder and not have a column height that is greater than 18”.

3.2.3 Mounting the VN Series

The VN Series will be mounted on a customer-supplied product hopper or framework. It is very important that the product hopper or framework be built so that it will support the VN Series without allowing movement or plant vibration. The hopper flange will have a 12” X 12” inlet. The hopper flange is located 41-½” from the front edge of the unit, and 12-½” from either side. The flange is equipped with ½”-13 X 1-½” studs that are located on 5-inch centers, in a 15” X 15” pattern.

Important: *The feeder pan on the vibratory feeder is set to a 6° downward angle at the factory.*

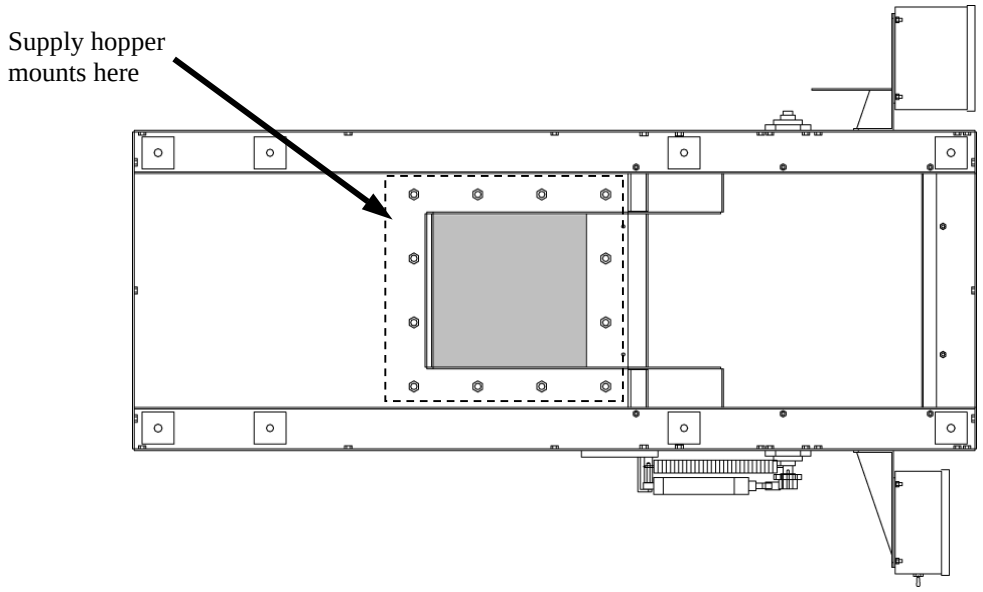


Figure 3-2. Supply Hopper Mounting Surface – Top View of VN Series

1. The VN Series should be suspended from a sturdy product hopper or framework, that is capable of supporting it without allowing it to move, or allowing vibration to interfere with its operation. The VN Series has four mounting bolts, one for each corner of the machine.

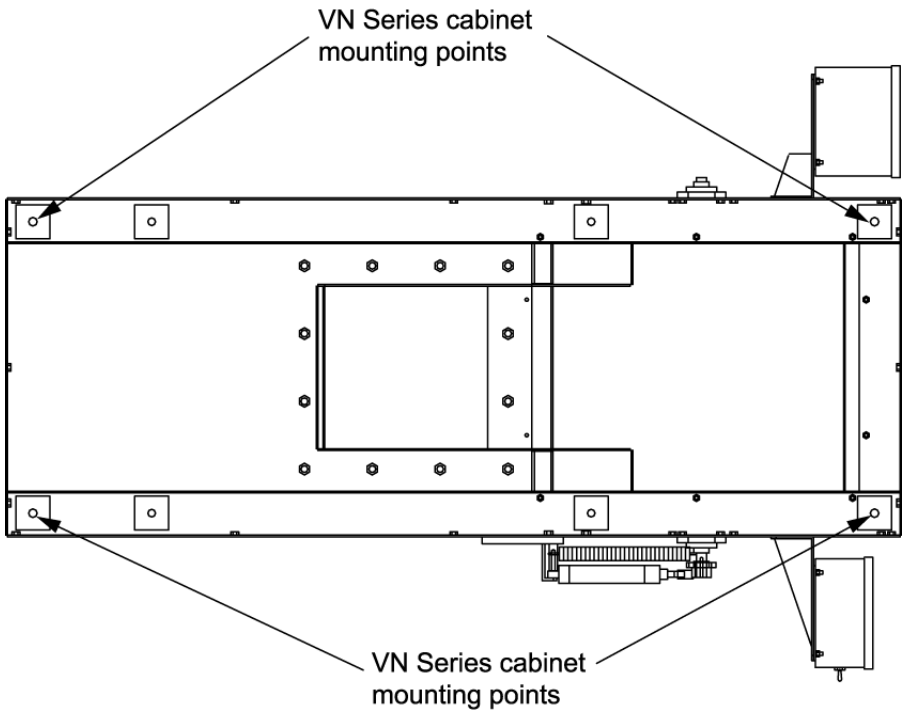


Figure 3-3. VN Series Cabinet Mounting Points

2. Lift the VN Series into position. Install and tighten the mounting hardware (bolts, washers, and nuts).
3. Loosen the four shipping nuts fully.

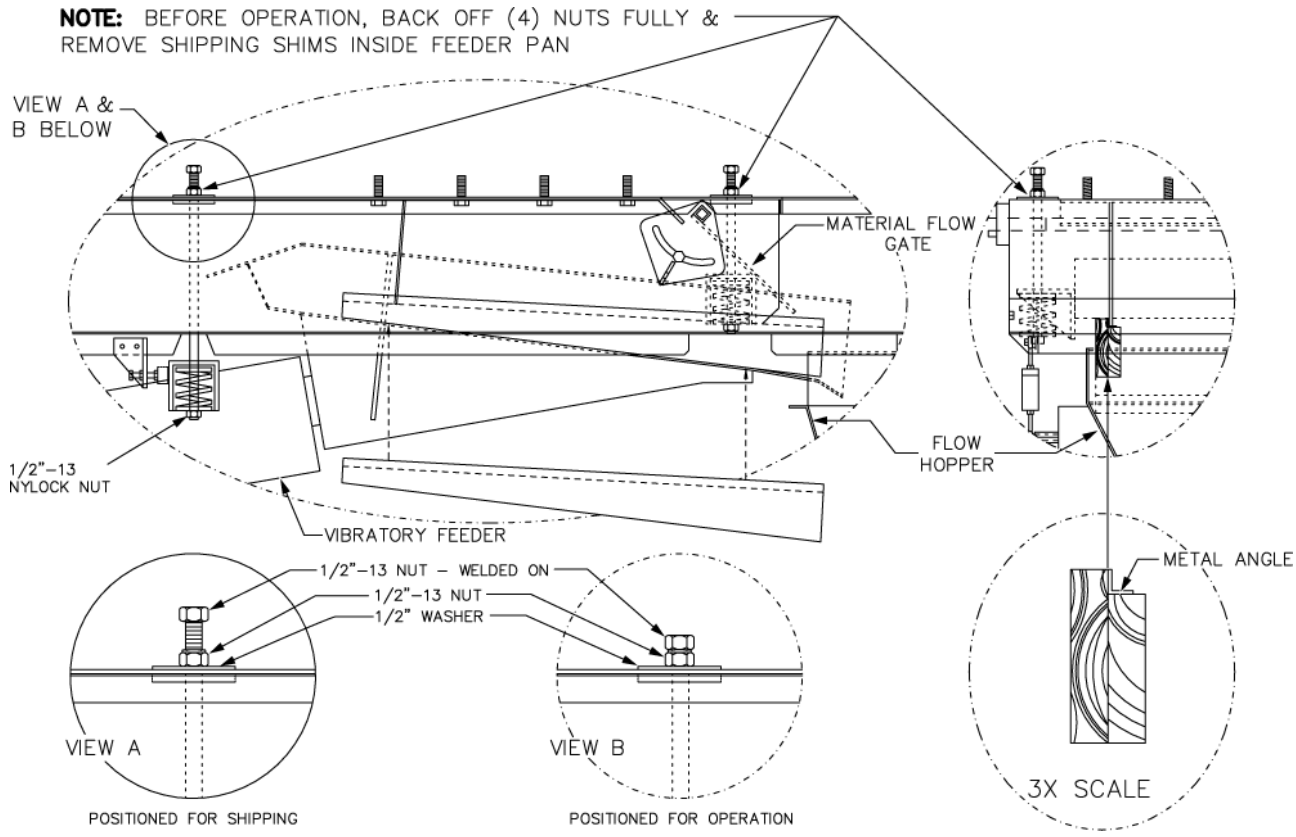


Figure 3-4. Shipping Nuts/Shims

4. Remove the shipping shims inside the feeder pan.
5. Connect the plant air supply line to the FRL. Refer to 3.4 Making Pneumatic Connections.
6. Connect the main electrical connections to plant supplied power receptacles. Refer to 3.3 Making Electrical Connections.
7. Install the spout. Refer to 7.3.9 Spout Replacement.

3.3 Making Electrical Connections

Before connecting the VN Series to the electrical supply, it is vital that the unit be properly grounded. The recommended method is to plug the power cord into an earth grounded receptacle.

The VN Series is designed to operate on 115 VAC at 50 or 60 Hz. The VN Series is equipped with two power cords. One is connected to the control panel for the vibratory feeder, while the other is connected to the control panel that contains the weigh meter. The power receptacles should be placed within 6 feet of the VN Series.

> ***Important:*** *Refer to the electrical diagrams for the specific machine being worked on for proper line and breaker sizing.*

3.4 Making Pneumatic Connections

The VN Series requires a compressed air supply line that is capable of delivering approximately 2-4 CFM (57-113 liters) @ 80-125 PSI (.55-.86 MPa) of compressed air. Taylor Products recommends that the air supply line be equipped with a refrigerated air dryer, or at the very least a water separator. After making pneumatic connections, check all connectors for leaks using a soapy water mixture. Bubbles will appear at the site of any leaks. Eliminating or reducing air leaks will reduce wear on the air supply equipment.

3.4.1 Pneumatic Component Lubrication Requirements

The pneumatic cylinders require lubrication to ensure their proper operation and to extend their useful life. The lubricator should be filled with 10 weight, non-detergent oil.

The oil flow control knob, located on top of the lubricator, should be set so that the lubricator is delivering 1 drop of oil for every 30 bags that are filled.

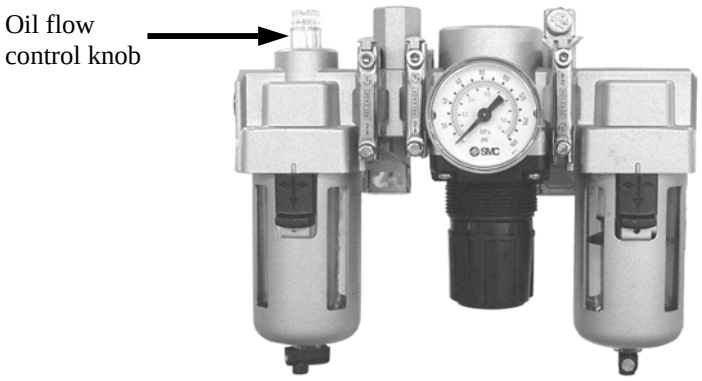


Figure 3-5. Lubricator – Oil Flow Control

Use caution when setting the flow control on top of the lubricator. While too little oil can cause operational problems, so can too much oil. If the oil control is set too high, it may result in gummed up solenoid valves and cylinders.

3.5 Making Network Connections (T3000 Only)

Model VN Series units that are equipped with the optional T3000 control set have the ability for total monitoring and instrument control via the built in communication connectivity of the T3000. The T3000 has the following network capabilities:

- DeviceNet
- HardyLink Ethernet
- IR Port
- RS-232 Simplex Serial Port
- Remote I/O (RIO) (optional)
- ControlNet (optional)
- Profibus I/O (optional)
- Modbus over TCP/IP (optional)
- OLE Process Control (OPC) (optional)

3.6 Establishing Security Settings

The manager has the ability to control who does and who does not have the ability to change system and calibration settings, regardless of the type of control panel that the machine is equipped with. However, the process for setting the security parameters varies by controller type.

3.6.1 T4000 Security Settings

The Security parameters allow management to place security on the instrument and any menu or sub-menu requiring a password before enabling any changes. The Change Security parameter enables all persons to see the security status for a given menu, and selected persons to change that security status for any menu.

1. From the Standby screen, press the function button below MENUS.
2. The Configuration menu will appear. Press the down arrow until the cursor is in front of Security.

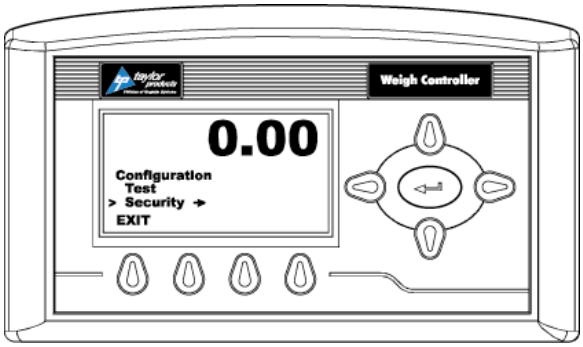


Figure 3-6. Placing The Cursor In Front Of Security

3. Press the enter button. The Security menu appears.
4. Set the Password Parameter. The Set Password parameter enables the operator to create a password for entry to secure menus and sub-menus. If the password is 0 there is no security. If the password is anything other than 0 the security is enabled.

   Note: *It is recommended that the passwords be created before setting security on the various menus.*

5. Press the down arrow button until the cursor is in front of Set Password.

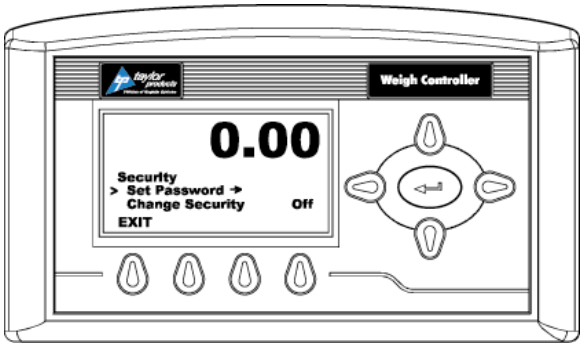


Figure 3-7. Placing The Cursor In Front Of Set Password

6. If the password is being set for the first time or if the factory defaults have been reset in the Test menu, enter the default password “2205”. If the password is being reset, and the existing password is known, enter that number. Press the enter button. The Verify Password display appears.
7. Press the enter button. If the password is correct a brief message “Entry Accepted” appears and the Set Password display with the current password appears.

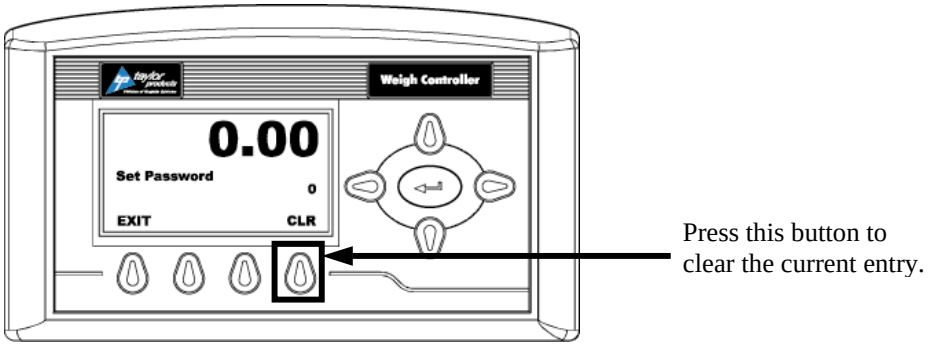


Figure 3-8. Set Password Menu

8. Press the function button located directly below the CLR item on the display to clear the entry. Use the left or right arrow buttons to move the cursor left and right. Use the up or down arrow buttons to enter the password number. To delete a single entry, press the left arrow button. In the example below, “123” was entered.

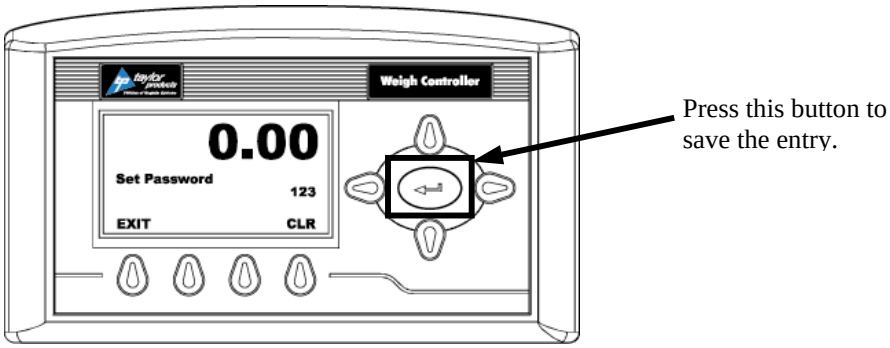


Figure 3-9. Password Set To 123

9. Press the right or left arrow buttons to toggle Change Security On. The Verify Password display appears.

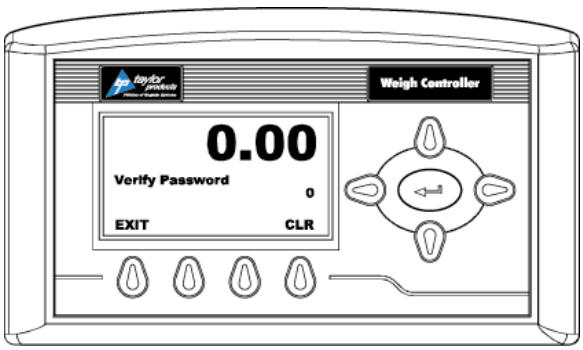


Figure 3-10. Verify Password

10. Use the left or right arrow buttons to move the cursor left and right. Use the up or down arrow buttons to enter the password number.

    Important: *When entering the password, the last digit is entered first, then the next digit to the left and so on. For example, if the password is set to 123, then 3 is entered first, then the 2, and the 1 is entered last.*

11. Press the enter button. The Change Security status changes to On. In this instance we turned Change Security ON because we want to change the security of a sub-menu.
12. Now that the Change Security On feature has been turned on, press the function button below the word EXIT on the display to return to the Configuration menu.
13. Use the up or down arrow buttons to go to the desired sub-menu to is to be secured. In the example below, the Decimal Point sub-menu has been selected. Notice that the display now includes a SECUR menu item above the function buttons.

    Note: *Steps 8-12 will need to be repeated to lock and unlock a parameter.*

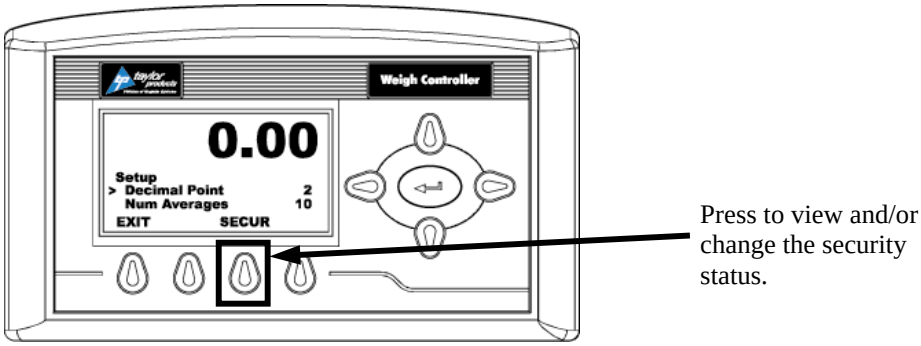


Figure 3-11. SECUR Menu Item Shown Above Function button

14. Press the function button that is positioned below the SECUR item on the display, to view and/or change the security status of this parameter.
15. Press the right arrow button to changed to LOCKED thereby securing this sub-menu.

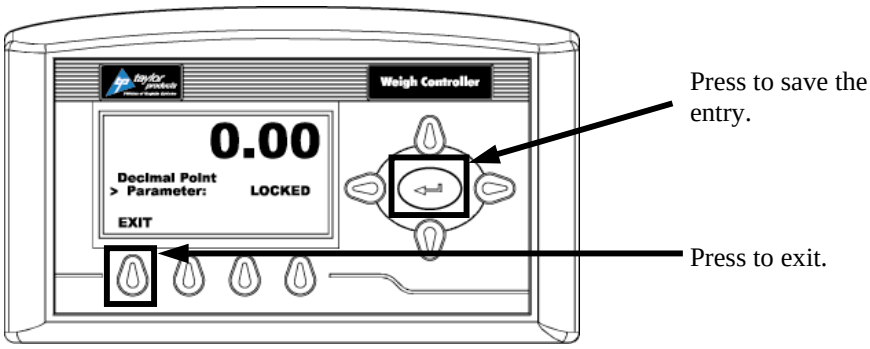


Figure 3-12. Parameter Shown Locked

16. Press the enter button to save the entry.
17. Press the function button below EXIT on the screen until the summary display is shown.

    Note: *To check to see if the security is set on a specific sub-menu, press the EXIT button until the summary display appears. Then re-enter the menus and try to change the secure parameters.*

18. Until security has been changed, changing this parameter will require a password (other than 0) to be entered.
19. To turn the Change Security OFF, go back to the Security menu and repeat steps 1-6.

3.6.2 T3000 Security Settings

On VN Series machines that are equipped with the optional T3000 control set, there are three levels of system security:

- Low – No password required
- Medium – A password is required to access some, but not all of the top level menus
- High – A password is required to access all top-level menus.

Additionally, the manager also has the ability to assign different levels of security to individual menus. The menus where this applies are:

- Adjust Ingredient
- Setup
- Calibration
- Options
- I/O Mapping

If a menu has a security setting of Medium or High, the users' access will be read-only, unless they enter the correct password.

The method for setting security settings on the T3000 is via the control panel. Follow the steps below to set security.

1. Press the User shortcut key. Enter the User ID and high-level password.
2. From the Standby display, press the Setup button. The Configuration Menu will appear.
3. Use the up/down arrows to position the cursor in front of SECURITY. Press the Enter button.
4. The SECURITY MENU will appear. The cursor will be in front of SET SECURITY MENU selection. Press the Enter button.
5. The SET SECURITY MENU will appear. The Top-Level Menus will be listed with the security level set at the default LOW setting.
6. Press the up/down arrow buttons to position the cursor in front of the desired menu selection.
7. Press the left/right arrow buttons to change the security setting for that menu item.
8. Once the desired security level is displayed, press the Enter button to set the entry.
9. If other menus require an adjustment to its security setting, repeat steps 5 through 7.
10. When all security setting adjustments have been completed, press the Exit button to return to the Standby display.

3.7 Dry Cycle

After the installation process for the VN Series has been completed, the operator should run the machine without any product to check each component for proper operation. Use the following procedure:

> ***Note:*** *The pneumatic cylinders may be tested manually by pressing the test buttons on their respective MAC valves.*

1. Press the STOP button in.
2. Turn the power switch on the control panel to the ON position.
3. Make sure that the air pressure on the FRL is set to specification.
4. Pull the STOP button out.
5. The vibrator cutoff gate will open and the vibrator will turn on.
6. Place an empty package on the spout.

> ***Important:*** *The bag clamps will actuate, however, the bag clamps will retract after two seconds if the bag in place switches are not "made". This means that the bag must be properly positioned and that the bag in place switch must be properly adjusted.*

7. When the operator hits the bale on the bag clamp actuator switch the machine will apply the bag clamps.
8. Push the STOP button in. The vibrator cutoff gate will close and the vibrator will shut off.
9. Press the DUMP button to open the dump gates on the weigh bucket.
10. Press the DROP button to release the bag from the spout.

3.8 Calibration

Each VN Series is calibrated prior to leaving the factory. However, the unit should be reassessed before first use of the unit. It is recommended that the calibration of the unit should be checked every week. A certified test weight MUST be used to check the calibration of the VN Series.

3.8.1 Calibrating the T4000 Controller

1. Make sure the T4000 has been configured for the intended application. This includes setting the units, decimal point, scale capacity, averages, etc.
2. From the Summary display press the enter button. The Configuration menu appears.
3. Press the down arrow button until the cursor is in front of Calibration.
4. Press the enter button. The Calibration menu appears.
5. Traditional Calibration is the method of calibration that uses test weights. Taylor Products recommends that the test weights total 80–100% of the desired package weight, and that the weight be distributed uniformly on/in the scale.
6. From the Summary display, press the enter button. The Configuration menu appears.
7. Press the down arrow button until the cursor is in front of the Calibration line.

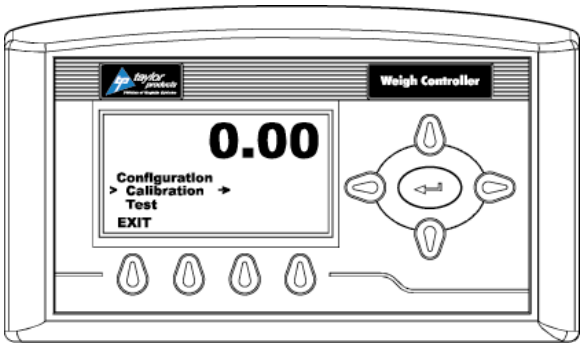


Figure 3-13. Placing the Cursor In Front Of Calibration

8. Press the enter button. The Calibration menu appears.
9. Press the down arrow button until the cursor is in front of “Trad Cal”.

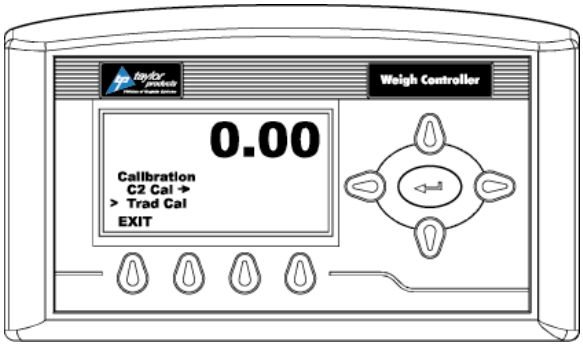


Figure 3-14. Placing The Cursor In Front Of Trad Cal

10. Press the enter button. The Trad Cal menu appears.

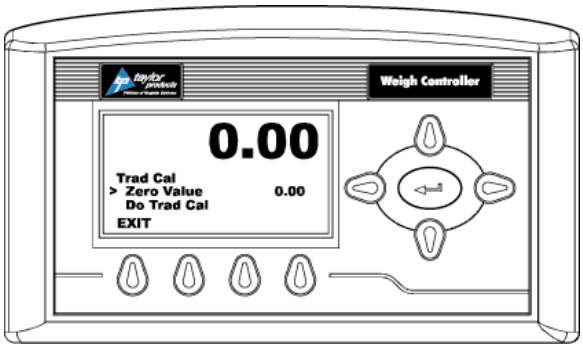


Figure 3-15. Placing The Cursor In Front Of Zero Value

11. Press the enter button. The Zero Value weight menu appears.

12. Traditional Calibration requires a zero point and the physical placement of test weights on the scale. To set the Zero Value Weight:
    a. Remove all weight "live load" from the Scale. The Zero Value should be 0.0.

> **CAUTION** The scale MUST be empty.

    b. Wait 12 seconds or more.
13. Use the left and right arrow buttons to position the cursor. Use the up or down arrow buttons to enter the Zero Value for this instrument.

    Note: *Most applications will set the Zero Value to 0.00.*

14. Press the enter button to save the entry.
15. Press the down arrow button until the cursor is in front of "Do Trad Cal " (Zero)".
16. Press the enter button to Do the Cal Trad Cal (Zero).
    a. A "Cal Completed OK" message appears briefly if the calibration was successful.
    b. An Error number appears if the calibration was not successful. An Error list is provided with the troubleshooting information later in this guide. Refer to this list in order to correct the error.
17. Press the down arrow button until the cursor is in front of Span Value.
18. Press the enter button. The Span Weight menu appears. The last Span Weight is displayed.

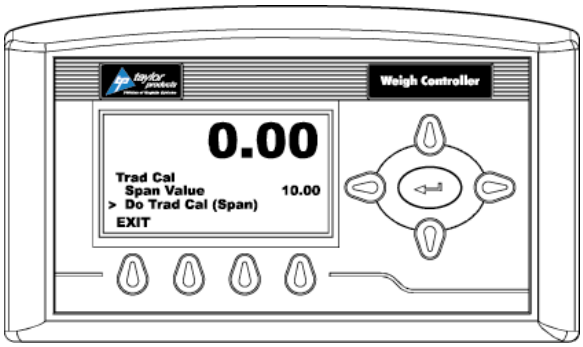


Figure 3-16. Span Value Displayed

19. To set the Span Weight:
    a. Place a certified test weight on the scale.
    b. Use the left and right arrows to position the cursor and the up or down arrows to enter the value of the test weight. If a 10 lb. weight is used, enter 10.00.
    c. Press the enter button to save the entry.
20. Press the down arrow button until the cursor is in front of "Do Trad Cal (Span)".
21. Press the enter button to Do the Trad Cal (Span).
    a. A "Cal Completed OK" message appears briefly if the calibration was successful.
    b. An Error number appears if the calibration was not successful. An Error list is provided with the Troubleshooting information later in this guide. Refer to this list in order to correct the error.
22. The scale is now calibrated.

3.8.2 Calibrating the Optional T3000 Controller

The Calibration Menu is used to calibrate the weighing system of the T3000 using the control panel.

Before beginning the calibration procedure, be sure that the machine is ready to be calibrated. Make sure that the load points have been installed properly. Follow the steps below to make sure the VN Series is ready for calibration:

1. Make sure the load system is free of binding and that nothing is draped over the equipment, such as hoses, electrical cords, tubes, etc.
2. Verify that the load cell is mounted so that the load always passes vertically through the load cells at the same point.
3. Check all communication and power cables to be sure they are securely fastened to their connectors on the rear of the control panel.
4. Make sure that power is supplied to the controller. The panel display should illuminate.

   Important: *The operator MUST log in with the proper security level to initiate calibration. Once logged in, an access timer will run. If the timer expires (typically about 5 minutes), the operator will be logged out. The operator will have to log in again to regain access.*

When the operator selects CALIBRATION from the Configuration Menu, the CALIBRATION screen appears. There is one line on that screen, it is the Cal Type line. The currently selected method of calibration will appear at the far right on the Cal Type line. Use the left/right arrow keys to toggle to until TRAD is displayed on the line. Press the Enter key to access the screen for the TRAD calibration method.

This screen will provide the following lines for the operator.

- Zero Value – This value should be set to zero.
- Zero Ct – This parameter is controlled by the controller.
- Do Trad. Cal (Zero) – Start the calibration procedure.
- Span Value – The amount of weight being used for calibration.
- Span Ct – This parameter is controlled by the controller.
- Do Trad. Cal (Span) – Start the calibration procedure.

Use this procedure to calibrate a machine with traditional load cells.

1. Turn on the meter.
2. Press the User shortcut key. Enter the User ID and medium or high-level password.
3. Press the Setup key to access the CONFIGURATION MENU.
4. Use the up/down arrow buttons to scroll to the CALIBRATION line. Press the Enter key to access CALIBRATION.

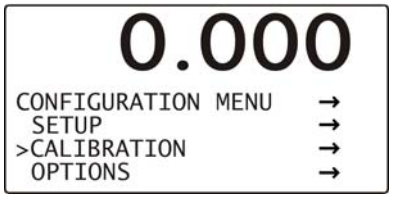


Figure 3-17. Calibration Line

5. Use the left/right arrow keys to toggle to the TRAD selection if it is not already displayed. Press the Enter key.

Figure 3-18. Selecting TRAD Calibration

6. A Function OK message will flash briefly in place of the Cal Type line, then the TRADITIONAL CAL screen will appear. Check the display to make sure that the Zero Value reads 0.0.

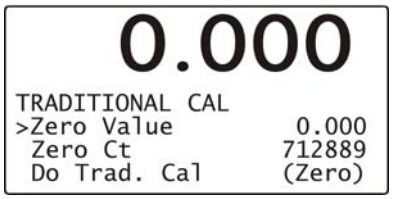


Figure 3-19. Checking Zero Value

7. Use the up/down arrow keys to scroll to the Do Trad. Cal (Zero). Press the Enter key. The weight display will display !Calibration in Progress! and will return to its calibration screen.
8. Use the up/down arrow keys to scroll to the Span Value selection and use the alphanumeric keypad to enter the weight that will be used for calibration. Press the Enter key.

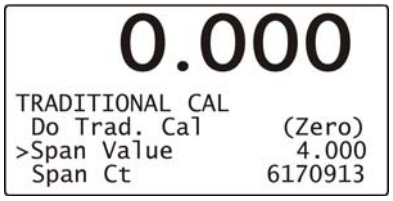


Figure 3-20. Setting Span Value

9. Use the up/down arrow keys to scroll down to the Do Trad. Cal (Span). Place the calibration weight on the scale by hanging it on the fill spout directly under the bag clamp cylinder. Press the Enter key. The weight display will display !Calibration in Progress! and will then return to its calibration screen. Press the Exit key three times to return to the main screen.

3.9 Timer and Counter Programming

All models of the VN Series utilize timers to allow them to function correctly. The timers are adjustable. The Allen-Bradley MicroLogix™ 1000 Programmable Logic Controller (PLC) will perform all timer functions. The PLC is mounted inside the control box and is connected to multiple electrical components. Components that are connected to the Input side of the PLC are components that are being monitored by the PLC. Components that are connected to the Output side of the PLC are components that are being controlled by the PLC.

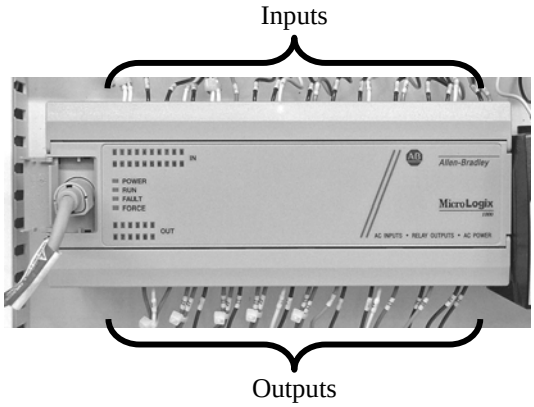


Figure 4-21. Programmable Logic Controller (PLC)

The operator adjusts the timer settings via the Allen-Bradley PV300 control panel that is connected to the PLC. The PV300 is mounted in the control box door, just to the right of the T3000. The PLC is mounted inside the control box. Refer to 4.3.4.1 PV300 Menus for information on timer adjustments.

- **Bucket Dump Time Delay** – The amount of delay after the dump gates open to when they are closed.
- **Auto Tare Delay** – The amount of time from when the start switch is made until the fill cycle begins. This delay gives the unit time to stop motion, so an accurate tare can be performed. This setting should be tuned so the auto tare occurs just as the motion stops. If auto tare is not being used, set it to zero to ensure the fastest fill.
- **Bag Not On Delay** – The amount of delay after that bag is clamped to when it is released, in the event that the bag in place switch has not been made. The factory default setting is 2 seconds.
- **Dump Delay** – The amount of time that will elapse from the time that the fill cycle ends until the dump gates open.
- **Drop Delay** – The amount of time that will elapse from when the vibrator stops until the bag clamps drop the filled bag. Set this so that the bag drops just after the last of the product enters the bag.
- **Bulk Counter** – This is an optional feature that is used when filling packages that are larger than normal. This option allows the VN Series to fill and empty the weigh bucket multiple times during a single fill cycle. The setting is the number of weigh bucket fill and dump cycles required to fill one bag. For example, if filling a 500 lb. bag, if this setting is set to 5, the machine will fill and dump the weigh bucket 5 times to fill one bag, with each weighment being 100 lbs. If the setting is 4, the machine will fill and dump the weigh bucket 4 times to fill one bag, with each weighment being 125 lbs.

This Page Intentionally Left Blank

Chapter 4
Operation

4.1 General Description

This chapter will provide detailed descriptions of the operational controls of the VN Series.

4.2 General Fill Cycle Information

The VN Series is a dual set point machine. This means that it uses two fill rates, bulk rate and dribble rate. Bulk rate is a faster rate that is used to fill the package quickly. Once the package achieves the SP1 weight, the main gate cylinder will be extended to close the main gate and slow the fill rate to the dribble rate. Once the package achieves the SP2 weight, the dribble gate will close and the filler will stop. Once the product that is in free fall settles into the weigh bucket, the product weight should match the target weight.

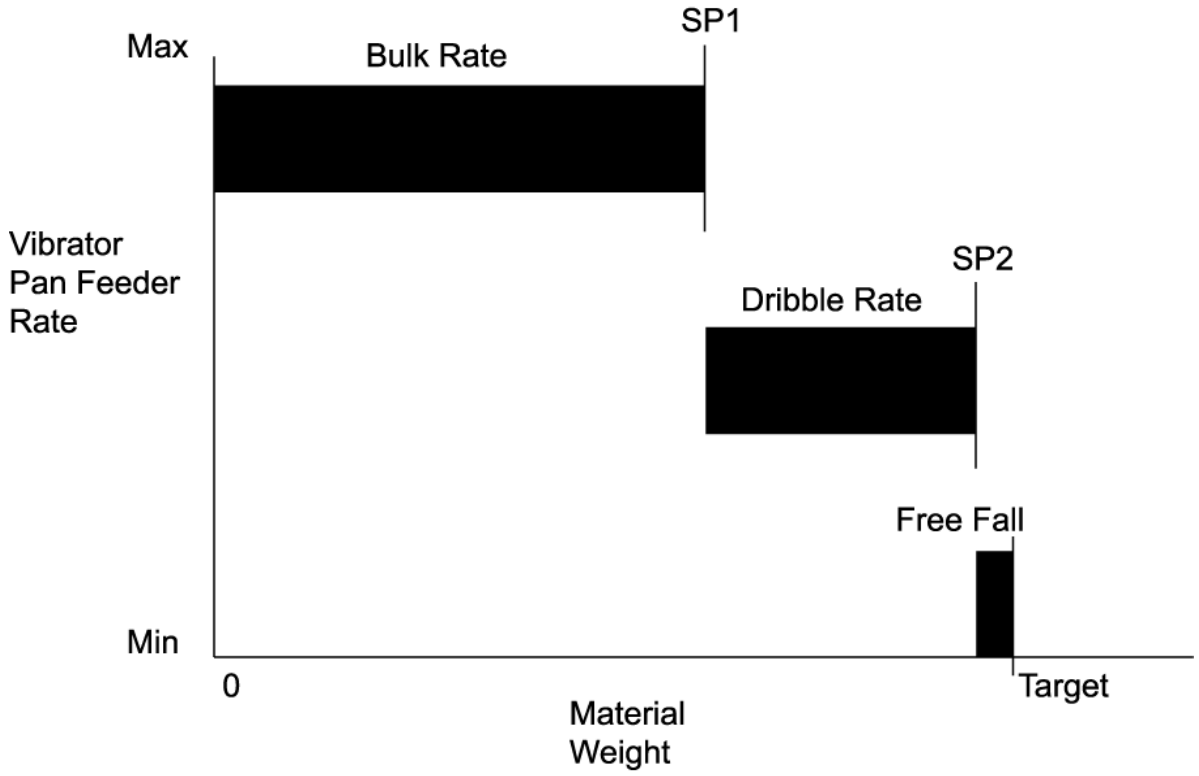


Figure 4-1. Fill Rates (DSP)

4.2.1 Basic Fill Process

The basic fill process for the VN Series will include the following events:

- The filler will load the weigh bucket with product
- The weighing system will weigh the product
- The operator will place a bag on the spout (this may occur while filling the weigh bucket)
- The weigh bucket will drop the product into the bag (bag in place switch must be “made” first)
- The dump gates will close and the fill cycle will start again
- The bag clamps will release the filled bag

The VN Series machines have a unique feature to prevent the operator releasing a package that is either underweight or overweight. On machines with the T4000 control panel, this feature is the Target Min/Max menu option. On machines with the T3000 control panel, this feature is the Over/Under Reject menu option. The operator will manually set the points where the package would be considered overweight and underweight. If the final weight of the product in the weigh bucket is outside of this range, the VN Series will hold the product in the weigh bucket until the operator manually releases the bag by pushing the MANUAL DUMP button. This feature is helpful when there is a sudden change in the bulk density of the material or when the feed bin runs out of material. This guarantees that no bag over or under the allowable weight will be shipped.

4.2.2 Typical Fill Cycle

The typical fill cycle will vary, based on the configuration of the machine. The fill cycle listed below assume that the machine has been turned ON, the controls have warmed up, and that the machine is already calibrated. The fill cycle can be broken down into three basic processes.

- Filling the weigh bucket
- Placing a bag on the spout
- Filling the bag

4.2.2.1 Filling the Weigh Bucket

1. Pull the STOP button out.
2. The dump gates will close (if they weren’t already closed).
3. The VN Series will auto-zero (this requires the auto-zero function to be enabled).
4. The cutoff gate will open and the vibrator will turn on. Product will flow into the weigh bucket.
5. When the weight of the product in the weigh bucket reaches SP1 (dribble weight), the vibrator will slow to the dribble rate. The weigh bucket will continue to fill, but at a reduced rate.
6. When the weight of the product in the weigh bucket reaches SP2 (cutoff weight), the cutoff gate will close and the vibrator will shut off. The flow of product into the weigh bucket has stopped.

4.2.2.2 Putting a Bag on the Bag Spout

The following steps can be completed while the weigh bucket is being filled. If the operator chooses to perform these steps after the weigh bucket has filled, the efficiency of the machine/fill cycle is reduced.

1. Place a bag spout and make sure that it is even. This means that the top of the bag should be level and line up with the top of the bag clamp pads.
2. Actuate the bag clamps. The operator does this by tripping the bale on the bag clamp actuator switch with their hand, or by using the optional foot switch.

   Important: *Once the bag clamps actuate, if the bag in place switch is not "made", the bag clamps will release after a 2 second delay. This means that the bag must be properly positioned and that the bag in place switch must be properly adjusted.*

CAUTION To prevent injury, keep hands clear of the clamps. The bag clamps must apply significant pressure to prevent the filled bags from slipping.

4.2.2.3 Filling the Bag

1. After successfully clamping a bag on the spout, a dump delay timer will run. The available range is 0 to 25 seconds (typically set to 0). After the timer expires, the dump gates will open.
2. The dump gates will stay open for the amount of time set in the bucket dump time parameter. Ideally, the timer will expire just as the product clears the weigh bucket dump gates.
3. Once the bucket dump timer has run, the dump gates will close. The cutoff gate will open and the vibrator will turn on, starting the next fill cycle.
4. After the dump gates open, another timer will start to run. It is the drop delay timer. Once the drop delay has expired, the bag clamp cylinders will retract and drop the bag. The operator can place an empty bag on the spout.

4.3 Operational Controls

The operational controls will vary, based on the type of control unit and any custom features that have been selected. The types of controls are:

- Mechanical controls (flow gate adjustment)
- T4000 controls
- T3000 controls
- PLC controls (PV300 control panel)

4.3.1 Mechanical Controls

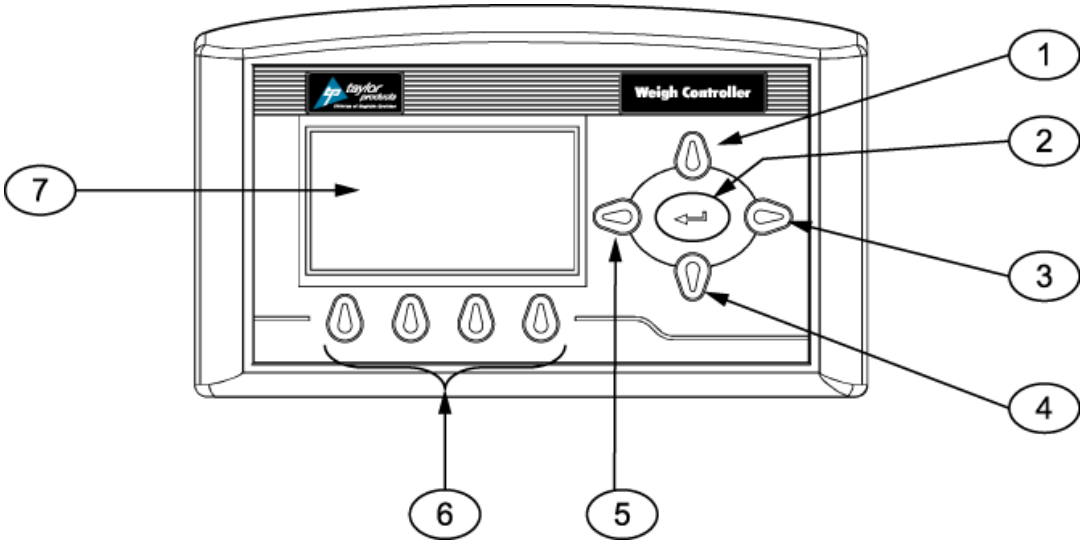
The VN Series does require some mechanical input from the operator to control how the machine functions. The flow gate determines the depth of material in the feeder pan, and thus is a contributing factor in how fast the weigh bucket will fill. The adjustment of the flow gate is done mechanically. The process for adjusting the flow gate is described in detail in 7.2.4 Flow Gate Adjustment.

4.3.2 Electrical Controls

The operational controls will vary, based on the type of control unit and any custom features that have been selected. This manual will focus on the standard T4000 control units, and the optional T3000 control unit.

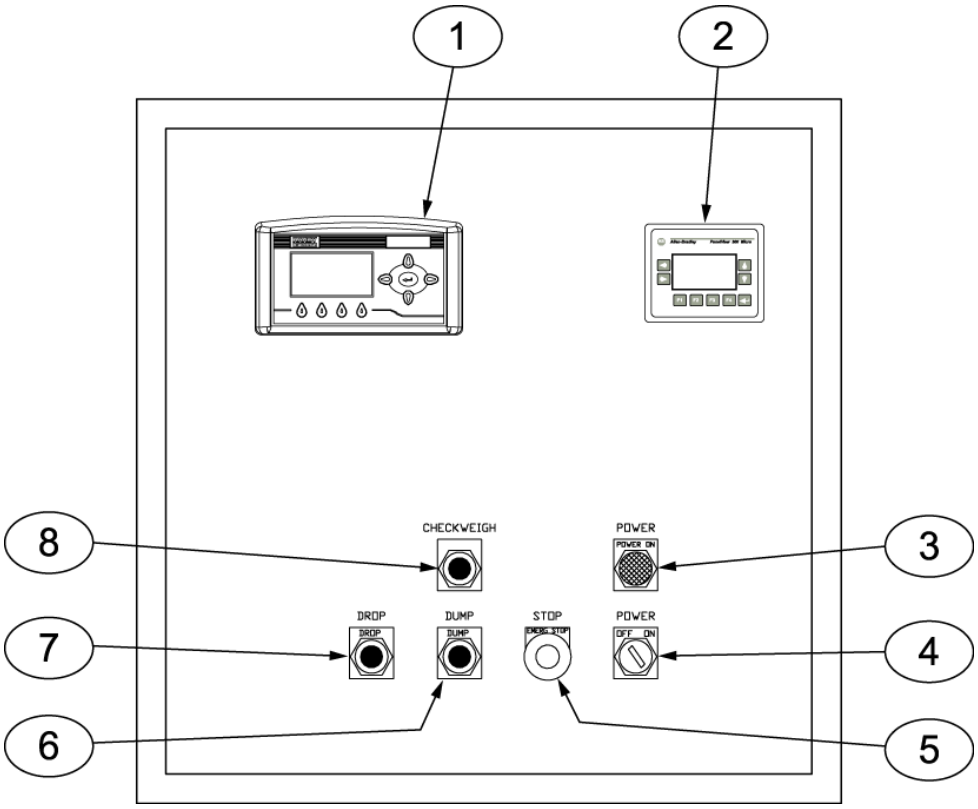
4.3.2.1 Control Box with T4000 Control Panel

The standard control box is equipped with a T4000 control panel, and several other manual control buttons, switches and indicators.



Item #	Description	Item #	Description
1	Up arrow button	5	Left arrow button
2	Enter button	6	Function buttons
3	Right arrow button	7	LCD panel
4	Down arrow button		

Figure 4-2. T4000 Faceplate



Item #	Description	Item #	Description
1	T4000 control panel	5	STOP button/indicator
2	PV300 control panel	6	DUMP button
3	POWER ON indicator	7	DROP button
4	POWER switch	8	CHECKWEIGH button

Figure 4-3. Standard Control Box With T4000 Control Box

4.3.2.2 Control Box With T3000 Control Panel

The T3000 control panel uses an electronic display in conjunction with a control pad that allows the user to make system adjustments and to monitor the system status.

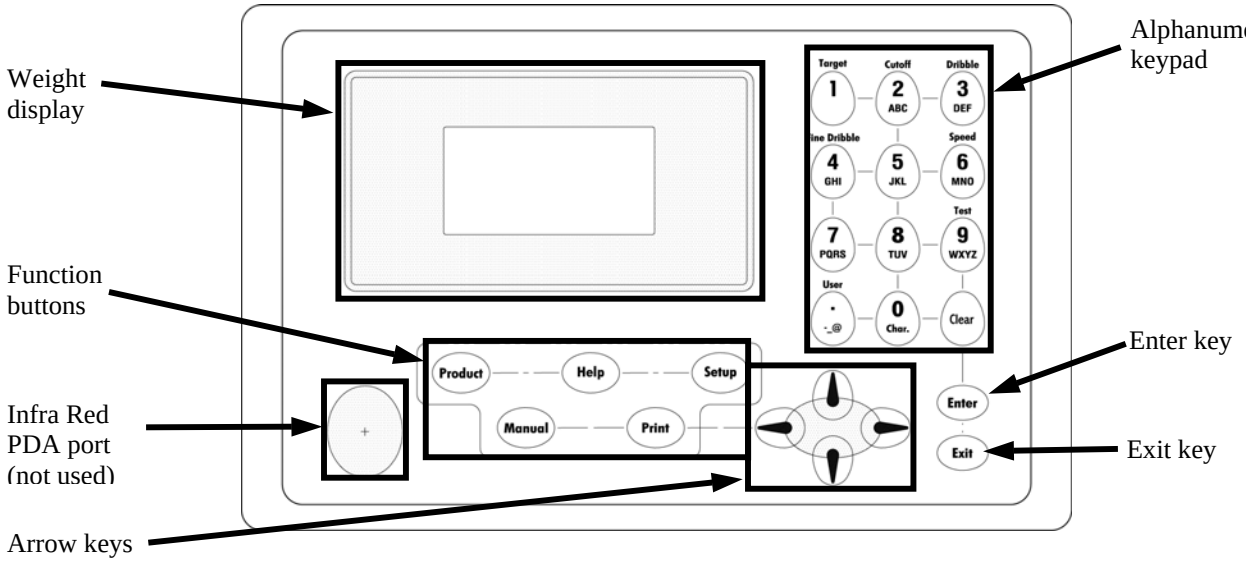
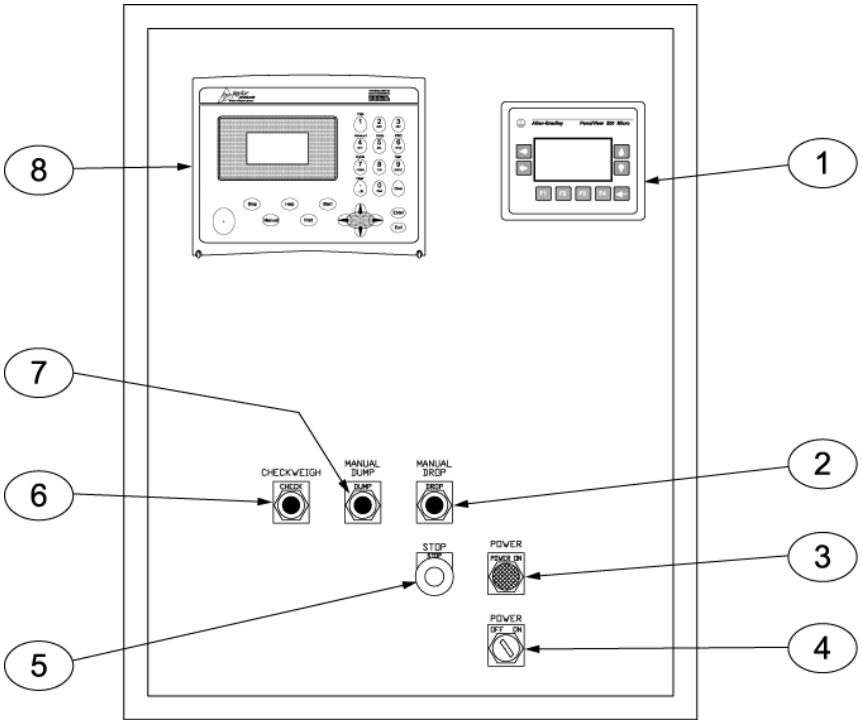


Figure 4-4. T3000 Faceplate Layout



Item #	Description	Item #	Description
1	PV300 control panel	5	STOP button/indicator
2	MANUAL DROP button	6	CHECKWEIGH button
3	POWER indicator	7	MANUAL DUMP button
4	POWER switch	8	T3000 control panel

Figure 4-5. Control Box With T3000 Control Panel

4.3.3 Allen-Bradley MicroLogix™ 1000

All VN Series units are equipped with an Allen-Bradley MicroLogix™ 1000 Programmable Logic Controller (PLC). The PLC is located inside the control box. The PLC is loaded at the factory with a software program that includes adjustable timers for specific functions. The PLC is equipped with multiple input and output connections. The inputs are used to monitor device status, while the outputs are used to control device operation. The processor takes the incoming data and compares that data to the program. When input conditions and the program deem it necessary that the PLC activate or change the state of a device connected to one of the output terminals, the PLC will execute that command.

Figure 4-6. Programmable Logic Controller (PLC)

The PLC also provides the ability to monitor the inputs and outputs. The PLC is equipped with LEDs to provide the status of each input and output. The PLC is also equipped with LEDs to provide the status of the power input, the current operational state, if there are any program or hardware faults, and if any of the outputs have been manually activated (forced).

4.3.4 PV300 Control Panel

All VN Series units are equipped with an Allen-Bradley PV300 control panel. This control panel is the interface to the Allen-Bradley MicroLogix™ 1000 PLC that is located inside the control box. The control panel is used to adjust system timers controlled by the PLC. The PV300 uses a series of menus to allow the operator to make these adjustments.

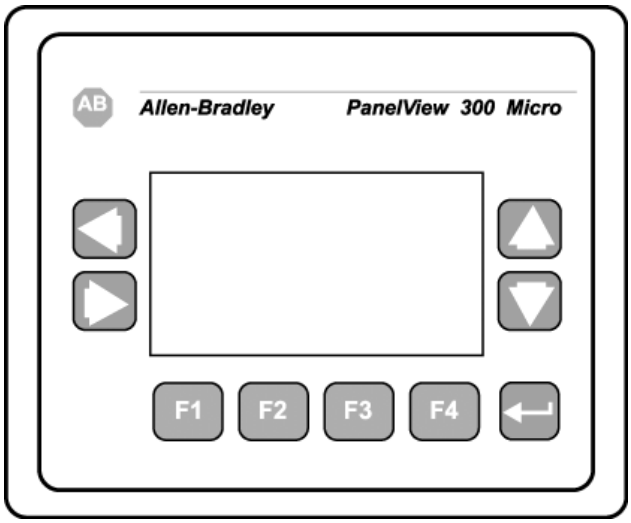


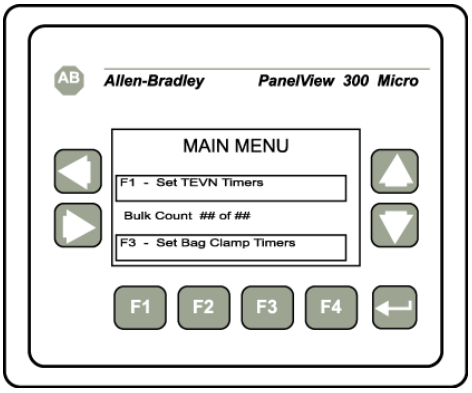
Figure 4-7. Allen-Bradley PV300 Control Panel

4.3.4.1 PV300 Menus

The PV300 has several menus that allow the operator to adjust different timer functions for the VN Series. The available timer functions, and their definitions are listed below:

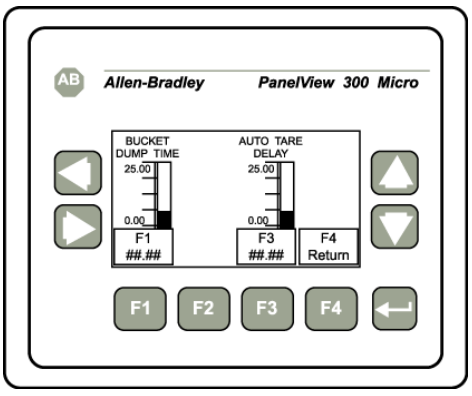
> ***Note:*** *Some of the timers mentioned below are for optional features. The machine that accompanied this manual may or may not have or use all of the timers listed.*

Table 4-1. PV300 Main Menu



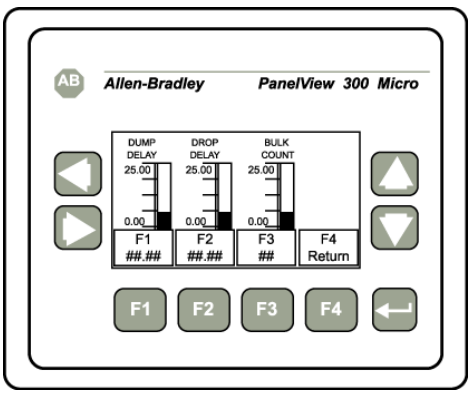
Key	Function
F1	Pressing F1 will result in the system advancing to the VN Series Timers screen.
F3	Pressing F3 will result in the system advancing to the Set Bag Clamp Timers screen.

Table 4-2. PV300 Timer Menu #1



Key	Function
F1	Pressing F1 will result in the system placing the cursor in the field where the Bucket Dump Time timer can be adjusted.
F3	Pressing F3 will result in the system advancing to the Auto Tare Delay screen.
F4	Pressing F4 will result in the system returning to the Main Menu screen.

Table 4-3. PV300 Timer Menu #2



Key	Function
F1	Pressing F1 will result in the system placing the cursor in the field where the Dump Delay timer can be adjusted.
F2	Pressing F2 will result in the system placing the cursor in the field where the Drop Delay timer can be adjusted.
F3	Pressing F3 will result in the system placing the cursor in the field where the Bulk Count can be adjusted.
F4	Pressing F4 will result in the system returning to the Main Menu screen.

4.4 Initial Setup

VN Series units can be categorized based on the type of controls they use.

- T4000 controls (standard)
- T3000 controls (optional)

4.4.1 Setting Up a VN Series With T4000 Controls to Fill

The VN Series is configured as a dual set point machine. It will use two fill speeds when filling, bulk rate and dribble rate. The bulk rate will fill the package at a fast pace until it is approximately 90% full. The machine will then slow the feed rate to the dribble rate. This rate is noticeably slower and is used to fill the package the rest of the way. Use the steps below to setup a VN Series with T4000 controls.

4.4.2 Setting Up a VN Series With T3000 Controls to Fill

The process for setting up a T3000 equipped VN Series will vary, based on if the product has already been programmed into the T3000 control panel.

4.4.2.1 Selecting Preprogrammed Products

VN Series units equipped with the T3000 can be programmed to fill as many as 25 different products. Use the steps below to select a specific product from the available list.

1. Check the T3000 to make sure the Filler is configured for the specific product that is being used.
2. Make sure the T3000 is in Standby Mode.
3. If the product shown on the display is the product that is going to be packaged, the setup is complete. If not, continue to Step 4.
4. If the product shown on the Standby Menu is not the product being packaged, do the following:
    a. Press the Product button once. A list of products that have been programmed into the control panel will appear. The currently selected product will be displayed.
    b. The operator can change the product using the up or down arrow buttons to scroll through the available list of products. When the desired product is found, position the cursor next to it and press the Enter button. The menu for that product will appear, with the cursor adjacent to the Accept Settings line. Press Enter again to accept the settings, or use the up/down arrows to scroll through the available parameters for that product. To change a specific parameter, place the cursor next to that line and key in the new value for that parameter, followed by pressing the Enter button. When finished, scroll back to the Accept Settings line and press the Enter button to accept the changes.

4.4.2.2 Using the T3000 to Set Up A Product From Scratch

To configure one of the 25 available product selections for a specific product, follow the steps below:

1. Press the Setup key once. The Configuration Menu will appear and will have the cursor on the ADJUST PRODUCT line. Press the Enter key.
2. The cursor will be positioned next to the currently selected product ID. Use the arrow keys to scroll down until the cursor is next to the first product number that has not been previously programmed.
3. Press the Enter key to select that product.
4. Position the cursor next to the line for the product name. Use the alphanumeric keypad to enter the name that has been selected for this product configuration. The default name can be used, but it is not recommended. Taylor Products recommends using a name that provides some indication of what the product configuration is for. Press the Enter key to save the change.
5. Scroll down to the Unit of Measure line. Use the left/right arrow keys to select the appropriate unit of measure (Lb, Oz, Kg, G). Press the Enter key to save the change.
6. Scroll down to the WAVERSAVER line. Use the alphanumeric keypad to enter the desired setting. Taylor Products recommends setting the WAVERSAVER to 3.50 Hz. Press the Enter key to save the change.
7. Scroll down to the Averages line. Use the alphanumeric keypad to enter the desired setting. Press the Enter key to save the change.
8. Scroll down to the Jog line. Press the Enter key to access the Jog Menu.
9. Set Jog On Time to 0.000s, to disable the jog function. Press the Enter key to save the setting.
10. Press the Exit key.
11. Scroll down to the Fill Timer Line. Use the alphanumeric keypad to enter a new value, if desired. Press the Enter key to save the setting.
12. Scroll down to the Wait Timer line. Use the alphanumeric keypad to enter a new value, if desired. Press the Enter key to save the setting.
13. Scroll down to the Speeds line. Use the left/right arrow keys to select the Dual speed setting. Press the Enter key to access the settings for that fill speed.
14. Use the left/right arrow keys to toggle between OFF and ON. When this option is ON, the controller will auto adjust the dribble point.
15. Leave the Mode setting at the factory preset setting.
16. Scroll down to the Fill Proof Menu and press the Enter key.
    a. The Fast Switch and Slow Switch settings MUST be off for the machine to run.
    b. The recommended setting for the Fast Switch Tmr and the Slow Switch Tmr is 5s.
17. Press the Exit key three times to return to the Standby Display.

4.5 Starting the Unit

Once the unit has been installed, and calibrated, it can now be started. The process for starting the VN Series will be the same, regardless of the type of control set that is used. The following steps are used to start the machine.

1. Press the STOP button in.
2. Turn the power switch to the ON position. The POWER ON indicator should illuminate. The weigh display, or controller display, should also illuminate and perform its initiation sequence. When complete, the weigh display or controller should display its opening screen.

   Important: *Allow the VN Series to warm up for at least 30 minutes before performing setup procedures or starting the first fill cycle.*

3. Pull the STOP button out, the cutoff gate will open and the vibrator will start.
4. Place a bag on the spout so that the bag in place switch is made. When placing the bag on the spout, the operator's hand should trip the bag clamp actuator switch lever, which will start the fill cycle.

This Page Intentionally Left Blank

Chapter 5
Preventive Maintenance

5.1 General Description

To minimize downtime, preventive maintenance should be made a priority. Proper preventive maintenance practices will also extend the life of the equipment. Developing a preventive maintenance schedule will ensure that critical maintenance procedures are not missed.

5.2 Daily Maintenance Procedures

At the start of each working day, the following maintenance tasks should be performed before starting the machine:

1. Thoroughly clean the machine.
2. Check the calibration, using a known weight.

5.2.1 Cleaning

Keeping the VN Series clean is an important part of the daily maintenance tasks. Remove any dust and/or dirt that may accumulate on a daily basis. Keeping the unit clean will keep debris from entering the control mechanisms, which could cause the performance of the VN Series to suffer. Also, by taking the time to clean the VN Series on a daily basis, the operator will be able to give the VN Series a thorough inspection. Take the time to inspect all components for possible damage. If a component is showing signs of wear, this will provide an opportunity to acquire the replacement components and schedule the repair work outside of normal production hours. This will result in minimal impact to the productivity of the machine.

5.2.2 Check Calibration

On a daily basis, check the calibration of the machine using a known weight. If calibration is required, refer to 3.8 Calibration.

5.3 Monthly Maintenance

On a monthly basis (every 700 operating hours), the operator should do the following items:

1. Inspect and service the filter and lubricator in the FRL.
2. Inspect all hoses, air cylinders, linkages, and bearings. Replace any worn or damaged parts.
3. Inspect the rubber shutoff gate seal. Replace the seal if it is worn or leaking.
4. Clean any dust or product that may have accumulated around the load cell.
5. Inspect the rubber bag clamp pads. Replace them if they are worn.
6. Check the calibration. Refer to 3.8 Calibration.
7. Check the retainer flange bolts. Tighten them if they are loose.

This Page Intentionally Left Blank

Chapter 6
Troubleshooting

6.1 General Description

When a problem occurs, proper troubleshooting techniques will allow maintenance personnel to quickly identify the problem.

6.2 The Troubleshooting Process

The actual troubleshooting process is just as important as the repair process. Use the following troubleshooting keys to assist with the troubleshooting process:

- Identify the trouble symptom
  - What is the problem?
  - What were the circumstances when the problem occurred?
  - Could weather be a factor?
  - Are there any other contributing factors?
- Sectionalize the problem
  - Look at the problem.
  - What area of the machine is the problem occurring in?
  - Has anything changed recently?
- Isolate the problem
  - Try simple things first.
  - Observe indication and trouble codes.
  - Check test points.
  - Avoid complicating the problem.

6.3 Trouble Symptoms

Use the following information to assist in troubleshooting.

6.3.1 Scale is Not Accurate

If the load cell is providing inaccurate readings, check the following:

1. Check for proper calibration. Refer to 3.8 Calibration.
2. Check the surge hopper to make sure an adequate supply of material is available in the product hopper to ensure a consistent head pressure.
3. Check to make sure there is nothing restricting material flow from the surge hopper.
4. Check the shipping bolts/nuts. Make sure the shipping nuts have been backed off until they bottom out against the mount.

6.3.2 Scale Does Not Return to Zero

If the scale reading does not return to zero after the weigh bucket has been dumped. Check the following items:

1. If the AutoZero function is enabled, the weight display will show a negative weight reading.
2. Check to make sure that nothing is coming in contact with the weight bucket.
3. Check the inside of the weigh bucket to make sure that the product is not sticking to the inside of the weigh bucket.

6.3.3 The Cutoff Gate Does Not Open

If the cutoff gate does not open when the STOP button is pulled out, check the following:

1. Check the power coming into the unit to make sure you have 115 volts.
2. Check the bag clamp actuator switch to see if it is functioning.
3. Check the bag in place switch to see if it is functioning.
4. Check the function of the MAC valve. Press the test button(s) to see if the pneumatic valve changes states.
5. Check for the presence of air to the MAC valve. If compressed air is not available, correct the air supply problem.

6.3.4 Weighments are Erratic

If the weighments vary from too high to too low, check the following items.

1. Check the mechanical operation of the weigh bucket to make sure there is not anything coming into contact with it.
2. Check the dribble (SP1) and cutoff (SP2) set points. Once SP1 is achieved, the machine should run at the dribble rate for a minimum of two seconds for proper operation.
3. Check the load cells for proper operation. If a load cell is damaged or does not function properly, replace it.
4. Check the zero of the machine. Make sure it stays on zero and doesn't jump around. If the zero is unstable, a faulty load cell or zero pot may be the cause.

6.3.5 Machine Fails To Start After The STOP Button Is Pulled Out

If the VN Series won't start when the bag clamp actuator switch is tripped, even though the machine is turned on, check the following items.

1. Check the STOP button to see if the contacts are working properly.
2. Check the voltage to and from the STOP button. The voltage should be 110 volts.
3. Check the MAC valve to see if it is getting voltage and the valve is functioning properly.
4. Check for the presence of voltage at the auto zero delay timer. If voltage is present, check to see if the valve changes states. If it does not change states, replace the MAC valve. Refer to 7.3.11 MAC Valve Replacement.
5. Check the MAC valve to see if it is getting air. If compressed air is not being supplied to the MAC valve, correct the air supply problem.

6.3.6 Bag Clamp Won't Apply

If the bag clamps do not apply when the bag clamp actuator switch is tripped, check the following items:

1. Check the bag clamp actuator switch to see if it is functioning.
2. Check the MAC valve to see if it is getting voltage and the valve is functioning properly.
3. Check the MAC valve to see if it is getting air. If compressed air is not being supplied to the MAC valve, correct the air supply problem.

6.3.7 Bag Clamp Won't Release

If the bag clamps won't release, use the steps below to diagnose the problem.

1. Check the MAC valve to see if it is getting voltage and the valve is functioning properly.
2. Check the MAC valve to see if it is getting air. If compressed air is not being supplied to the MAC valve, correct the air supply problem.

6.3.8 Bag Clamp Applies, But Doesn't Stay Applied

If the bag clamps won't stay applied, even though a bag is properly positioned, use the steps below to troubleshoot the problem.

1. Check the bag in place switch to see if it is functioning.

6.3.9 Load Cell Fails Frequently

CAUTION A sudden jerk or shock, such as being struck by a tool or hitting the spout, etc., can cause load cell damage. The load cell is NOT covered by warranty.

If the load cell fails frequently, check the following items:

1. Check the operating conditions to make sure that the load cell is not jarred, jerked, or being loaded with a sudden excessive force.
2. Check the load cell to make sure that the product being weighed does not exceed the rating of the load cell.

6.3.10 Fill speeds are too slow

If the fill rate is slow, check the following items:

1. Check the dribble (SP1) setting to make sure it isn't set too low. This would result in longer fill times.
2. Check the adjustment of the flow gate. If the gate is closed too far, the fill rate will be too slow.
3. Check the cutoff gate to make sure that it is opening all the way. If the gate is not opening fully, it could restrict the flow of product off of the end of the feeder pan.

6.4 System Alarms

Both the T4000 and the T3000 control systems monitor the overall system and can alert the operator to any condition that is outside of the acceptable operating parameters.

6.4.1 T4000 Alarms

During the filling process, conditions may occur that result in one of the following T4000 alarms:

- A/D Failure Error! – An internal electronics error has occurred. Retry the operation. If the failure error re-occurs, power the machine down, then restart the machine and try the operation again. If the operation still fails, contact Taylor Products technical assistance.
- A/D Convert Error! – The input from the load cell is outside of the acceptable range. Check the load cell for damage. If a new load cell has been installed, check the rating of the load cell to make sure that the correct load cell has been installed.
- Motion Error! – The controller has detected that the vessel or product is in motion and the controller cannot finalize the weighment. Check the machine settings and retry.
- Trad Cal Error! – An error occurred during the calibration process. Try to calibrate the machine again. If the error occurs again, contact Taylor Products technical assistance.
- C2 Cal Error! – This error should not occur, as Taylor Products does not use C2® type load cells. If this error does occur, contact Taylor Products technical assistance.
- Too Lo Error! – Verify that the load cell signal level is 0-15 mV. Verify that there is enough weight on the scale. Perform Span then go back and Zero.
- Too Hi Error! – Verify that the load cell signal level is 0-15mV. Verify that there is not too much weight on the scale. Perform Span then go back and Zero.
- No C2 Sensor! – Instrument did not detect a C2® Load Sensor. This error should appear if C2® Cal is selected, as Taylor Products does not use C2® type load cells. If this error does occur, contact Taylor Products technical assistance.
- CAL Failed! – There are too few counts between Zero and Span. Reset either of the values, so that the counts are more than 1,000 counts of each other.
- C2 Caps Unequal! – This error should not occur, as Taylor Products does not use C2® type load cells. If this error does occur, contact Taylor Products technical assistance.
- HI/LO Too Close! – The Zero and Span values are not more than 1,000 counts from each other or there is no change, or there is a negative change. Reset either of the values, so that the counts are more than 1,000 counts of each other.
- Function Error! – The operator has pressed a function button and the function did not work. Try the function again. If it does not work, cycle the power off and on. If it still doesn't work, contact Taylor Products technical assistance.
- Not Allowed! – The value entered by the operator is outside of the range that is allowed. The operator should try another value that is within the acceptable range.
- Security Violation! – User signed in with a password that does not allow performance of a certain function or entry to certain menus. Security level of the user identified in the User ID, too low for the menu or function.
- Overrange – The final package weight has exceeded the set point target.
- Gross ADC Error – The controller has detected a load cell error. Check all load cell connections. Repair connections as necessary. Check the load cell for damage. Replace the load cell if necessary. Refer to 7.3.1 Load Cell Replacement.

6.4.2 T3000 Alarms

During the filling process, conditions may occur that result in an alarm from the T3000. There are three different categories of alarms:

- Fill alarms
- Jog alarms
- Filler discharge alarms

For a full description of these alarms, refer to Chapter 3: Operating Procedures/Filler, of the Taylor Products Filler/Dispenser/IBC T3000 User Guide, that is included in Appendix E of this manual.

6.4.2.1 Fill Alarms

Fill alarms are used to indicate that current conditions will not allow the selected fill feature to function properly. These alarms are:

- Not OK to fill alarm
- Lost OK to fill alarm
- No fast feed alarm
- Feed on alarm
- No medium feed alarm
- No slow feed alarm
- Slow feed on alarm
- Fill timeout alarm
- Underfill/overfill alarm

6.4.2.2 Jog Alarms

Jog alarms are used to indicate that current conditions will not allow the selected jog feature to function properly. These alarms are:

- Did not jog alarm
- Jog stuck on alarm
- Jog count alarm

6.4.2.3 Filler Discharge Alarms

Filler discharge alarms are used to indicate that current conditions will not allow the selected fill feature to function properly. These alarms are:

- Not OK to discharge alarm
- No discharge alarm
- Discharge clogged alarm
- Discharge on alarm

This Page Intentionally Left Blank

Chapter 7
Repair and Adjustment

7.1 General Description

When troubleshooting procedures have indicated that a component needs to be repaired, replaced, or adjusted, following the repair procedures contained in this chapter will assist maintenance personnel return the machine to operation in a timely manner.

7.2 System Adjustments

Depending on how the VN Series is configured, there are several adjustments that may be required from time to time. They are:

- Air pressure adjustments
- Cutoff gate adjustments
- Air flow adjustments
- Flow gate adjustment

7.2.1 Air Pressure Adjustments

The Filter/Regulator/Lubricator (FRL) is the air pressure regulator for the VN Series. The machine requires that compressed air from the compressor be between 80 and 100 PSI (.55-.69 MPa) at 15 SCFM for proper operation. The operator will set the pressure regulator on the FRL to 80 PSI (.55 MPa). If air pressure is too high, the air pressure regulator can be used to adjust the output air pressure. The pressure regulator cannot be used to increase the air pressure higher than the pressure of the source.

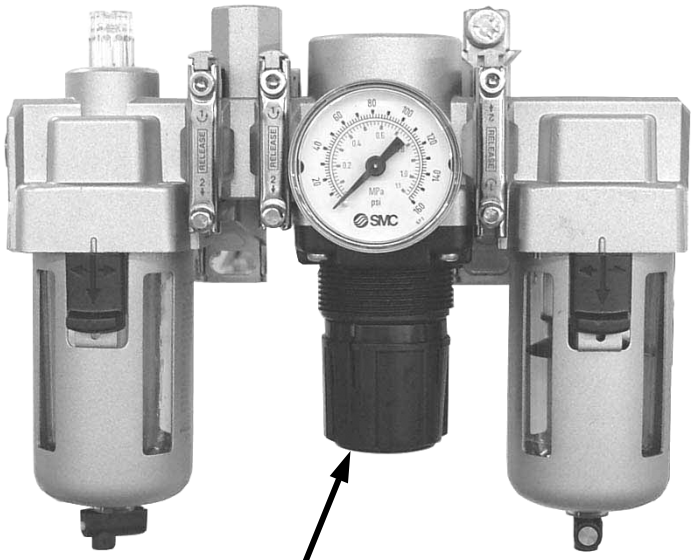


Figure 7-1. Air Pressure Adjustment

7.2.2 Cutoff Gate Adjustment

Over time, the cutoff gate seal may wear from coming into contact with product in the feeder pan. This wear may result in the cutoff gate allowing product to leak out of the feeder pan. The operator may need to adjust the cutoff gate to seal off the end of the feeder pan when closed. There are two adjustments that can be made. One way to adjust the gate is by adjusting the cutoff gate cylinder rod end, while the other adjustment is made at the cutoff gate cylinder mount.

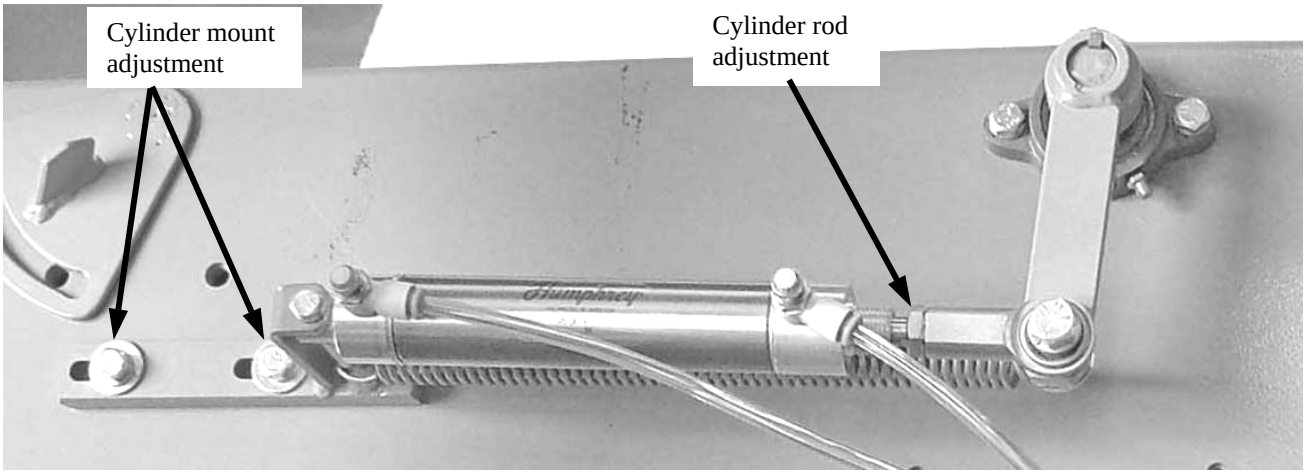


Figure 7-2. Cutoff Gate Cylinder and Mount

7.2.2.1 Adjusting The Cylinder Rod End

1. Loosen the jam nut on the cylinder rod-end.
2. Turn the cylinder rod to either shorten or lengthen the overall length of the cylinder and rod.
3. Tighten the jam nut.

7.2.2.2 Adjusting The Cylinder Mount

1. Loosen the mounting bracket bolts.
2. To clamp the cutoff gate tighter against the feeder pan, slide the mounting bracket rearward (away from the cutoff gate arm).
3. To make the joint between the cutoff gate and the feeder pan looser, slide the mounting bracket forward (toward the cutoff gate arm).
4. Tighten the mounting bracket bolts.

7.2.3 Adjusting Air Flow

If the actuation speed of a pneumatic component is either too fast or too slow, the operator may be able to adjust the actuation speed of that component, if it is equipped with a flow control adjustment valve. By adjusting the flow control knob on the valve that is installed on the air supply line to that pneumatic component, the operator can make the component actuate faster or slower, depending on their specific needs. Use the steps below to adjust airflow.

1. Locate the flow control valve in the supply line for the specific function that is not actuating at the correct speed. For example, if one of the bag clamp cylinders is not clamping quick enough, locate the flow control valve MAC valve that controls the affected component.
2. Turn the flow control knob counter-clockwise to increase the actuation speed, and turn the flow control knob clockwise to decrease the actuation speed.

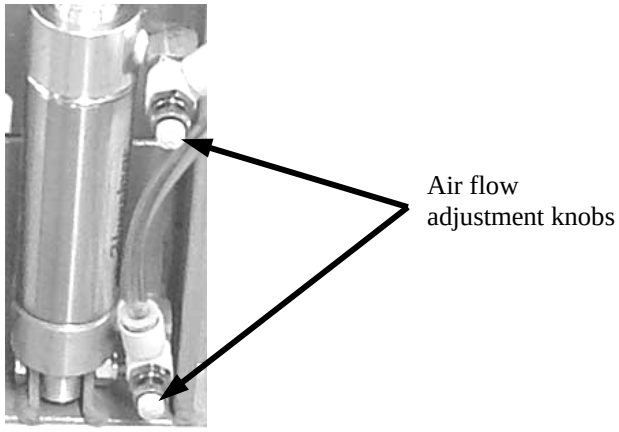


Figure 7-3. Air Flow Adjustment Knobs

7.2.4 Adjusting the Flow Gate

The flow gate controls the volume of product that flows to the end of the feeder pan.

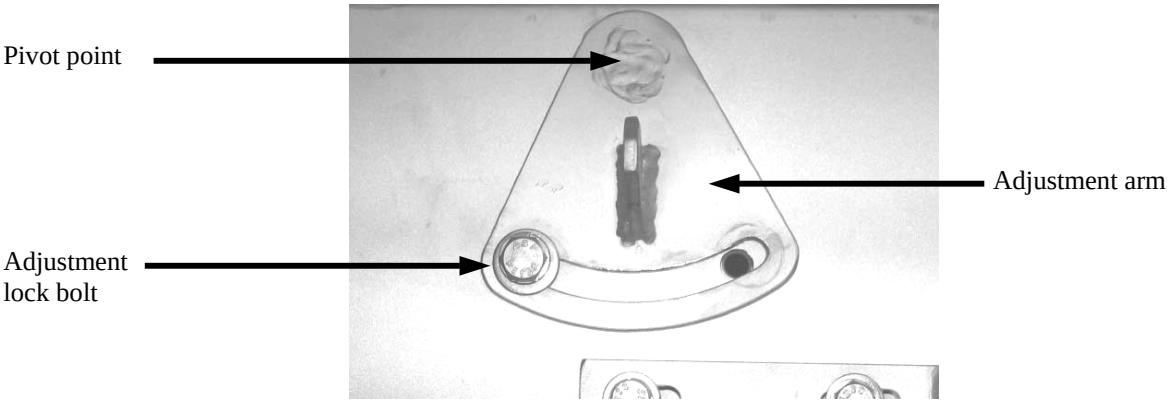


Figure 7-4. Flow Gate Adjustment Mechanism

1. Loosen the flow gate adjustment lock bolt.
2. Turn the adjustment arm clockwise to reduce the depth of product in the feeder pan. Turn the adjustment arm counter-clockwise to increase the depth of product in the feeder pan.
3. Tighten the flow gate adjustment lock bolt.

7.3 System Repairs

Over time, components on the VN Series may become worn or damaged. If this occurs, follow the procedures in this section to repair or replace individual components.

WARNING *When replacing parts, it is critical that only parts approved by Taylor Products are used.*

7.3.1 Load Cell Replacement

In the event of a load cell failure, use the following steps to replace it.

CAUTION A sudden jerk or shock, such as being struck by a tool or hitting the weigh bucket etc., can cause load cell damage. The load cell is NOT covered by warranty.

7.3.1.1 Load Cell Removal

1. Turn the VN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Remove the access panel that covers the load cell being replaced.
4. Install the shipping brackets to remove the load from the load cell.
5. Open the control panel.
6. Label and disconnect the load cell wires from the control board in the control panel.
7. Pull the load cell cable out of the control panel.
8. Remove any tie wraps that may be securing the load cell cable to the control panel, VN Series, or other cables.
9. Loosen and remove the load cell mounting bolts/nuts.
10. Remove the load cell and set it aside.

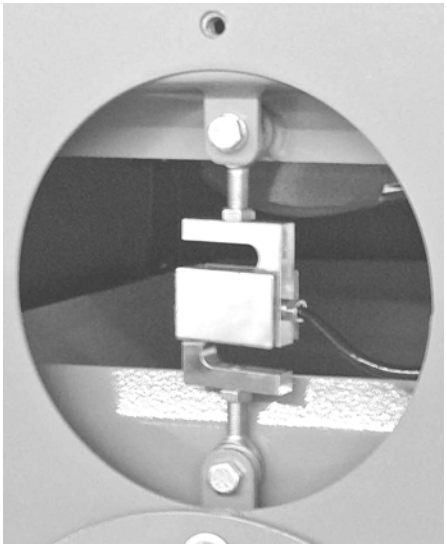


Figure 7-5. Load Cell (1 of 2 shown)

7.3.1.2 Load Cell Installation

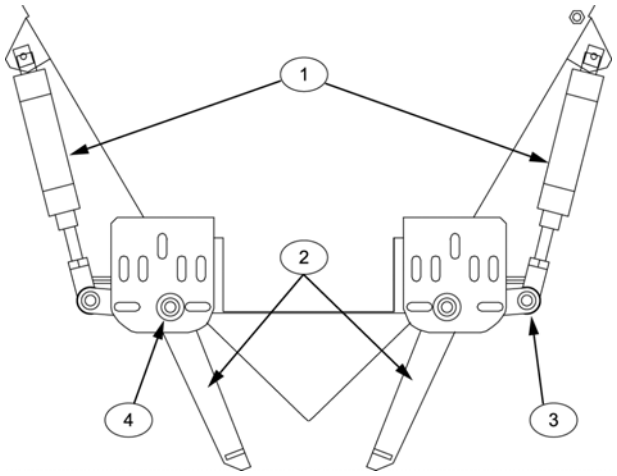
1. Carefully place the old load cell next to the new load cell.
2. Loosen the jam nuts on the rod ends on the old load cell about ½-turn.
3. Back the top rod end out of the old load cell.
4. Install the top rod end into the new load cell until the jam nut just touches the load cell.
5. Back the top rod end out of the new load cell ½-turn.
6. Tighten the jam nut on the top rod end against the load cell. DO NOT over tighten the jam nut.
7. Back the bottom rod end out of the old load cell.
8. Install the bottom rod end into the new load cell until the jam nut just touches the load cell.
9. Back the bottom rod end out of the new load cell ½-turn.
10. Tighten the jam nut on the bottom rod end against the load cell. DO NOT over tighten the jam nut.
11. Position the load cell and install and tighten the top mounting bolt/nut.
12. Install and tighten the lower mounting bolt/nut.
13. Install the access panel.
14. Route the load cell cable into the control panel.
15. Connect the load cell wires to the control board.
16. Close the control panel.
17. Connect the main electrical and pneumatic connections.
18. Calibrate the VN Series. Refer to 3.8 Calibration.

7.3.2 Dump Gate Cylinder Replacement

If one of the dump gate cylinders fails to function, use the information below to replace it.

7.3.2.1 Dump Gate Cylinder Removal

1. Turn the VN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Open the access panel.
4. Label the air supply lines connected to the dump gate cylinder.
5. Disconnect the air supply lines from the dump gate cylinder.
6. While using a wrench to hold the bolt on the rod end of the cylinder, loosen and remove the mounting nut.
7. Remove the bolt from the rod end.
8. While using a wrench to hold the mounting bolt on the cylinder end, loosen and remove the mounting nut.
9. While holding the cylinder with one hand, remove the mounting bolt.
10. Remove the cylinder.



Item #	Description	Item #	Description
1	Dump gate cylinders	3	Dump gate lever
2	Dump gates	4	Dump gate pivot bearing

Figure 7-6. Dump Gate Cylinders

7.3.2.2 Dump Gate Cylinder Installation

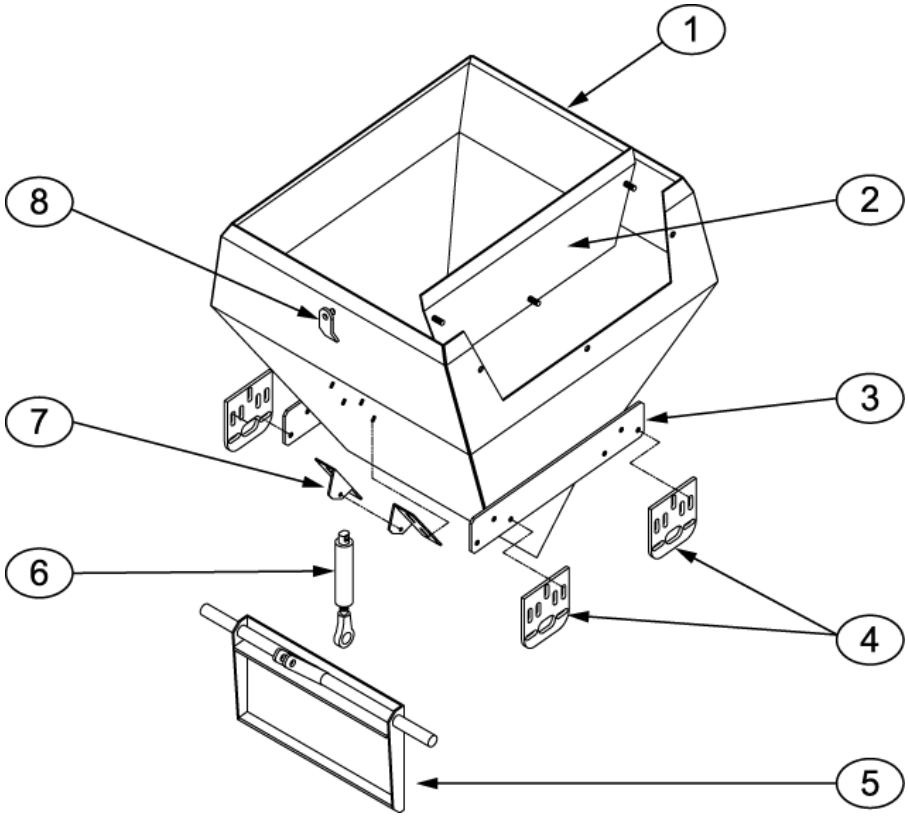
1. Place the new cylinder on a bench next to the old dump gate cylinder. Make sure that both rods are retracted. Loosen the jam nut on the rod end of the new cylinder.
2. Either tighten or loosen the rod end until it is even with the rod end on the old cylinder.
3. Tighten the jam nut against the rod end to prevent it from moving.
4. Position the cylinder in its mounting location and install the cylinder to mounting bracket bolt.
5. Install the washer and nut on the bolt. DO NOT over tighten the nut. Over tightening could impede the operation of the dump gate.
6. Position the rod end of the cylinder so that the rod end is lined up with the mounting arm on the dump gate. Install the mounting bolt.
7. Install the washer and mounting nut. Tighten the nut. DO NOT over tighten the nut. Over tightening could impede the operation of the dump gate.
8. Connect the air supply lines to the cylinder.
9. Connect the main electrical and pneumatic connections.
10. Turn the VN Series on and test for proper operation.

7.3.3 Dump Gate Replacement

Due to the abrasiveness of some products, the dump gates may require periodic replacement.

7.3.3.1 Dump Gate Removal

1. Turn the VN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Open the access panel.
4. Disconnect the dump gate cylinder from the dump gate.
5. Remove nuts from the dump gate mounting bracket bolts.
6. While holding the dump gate with one hand, remove the mounting bolts and then lower the dump gate.



Item #	Description	Item #	Description
1	Weigh bucket	4	Dump gate cylinder (1 of 2 shown)
2	Dump gate pivot bracket (gate not shown)	5	Dump gate (1 of 2 shown)
3	Dump gate pivot bracket (gate shown)	6	Dump gate cylinder to weigh bucket bracket

Figure 7-7. Dump Gate Components

7.3.3.2 Dump Gate Installation

1. Position the dump gate.
2. Install the mounting bolts.
3. Install the nuts on the mounting bolts.
4. Connect the dump gate cylinder to the dump gate.
5. Close the access panel.
6. Connect the main electrical and pneumatic connections.
7. Turn the VN Series on and test for proper operation.

7.3.4 Bag Clamp Pad (V-Type Bag Clamp) Replacement

Over time, the rubber bag clamps may become worn or may get damaged. Use the following steps to replace them.

7.3.4.1 Bag Clamp Pad (V-Type Bag Clamp) Removal

1. Turn the VN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Remove the four nuts that secure the bag clamp pad to the bag clamp arm.
4. Remove the four lock nuts from the bag clamp pad studs.
5. Remove the bag clamp pad.

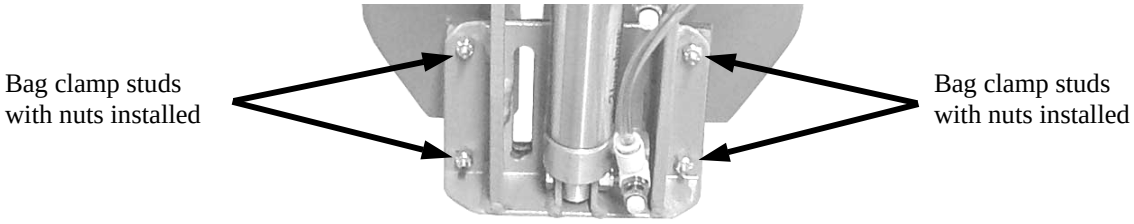


Figure 7-8. Bag Clamp Pad Mounting

7.3.4.2 Bag Clamp Pad (V-Type Bag Clamp) Installation

1. Position the new bag clamp pad so that the studs go through the four mounting holes in the bag clamp arm.
2. Install the lock washer and nut on each bag clamp stud.
3. Once all of the washers and nuts have been installed, tighten them.
4. Connect the main electrical and pneumatic connections.
5. Turn the VN Series on and test for proper operation.

7.3.5 Bag Clamp (V-Type Bag Clamp) Cylinder Replacement

If one of the bag clamp cylinders fails to operate or develops a leak, use the steps below to replace it.

7.3.5.1 Bag Clamp Cylinder (V-Type Bag Clamp) Removal

1. Turn the VN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Label and disconnect the air supply lines from the bag clamp cylinder.
4. Loosen and remove the nut from the cylinder to bag clamp mount bolt.
5. Remove the cylinder to bag clamp mount bolt.
6. Use a wrench to back the jam nut off about ¼ turn. Back the jam nut off just enough to allow the cylinder rod to turn in the pivot block.
7. While holding the cylinder with one hand, back the rod end out of the pivot block with the other.
8. Remove the cylinder from the VN Series.

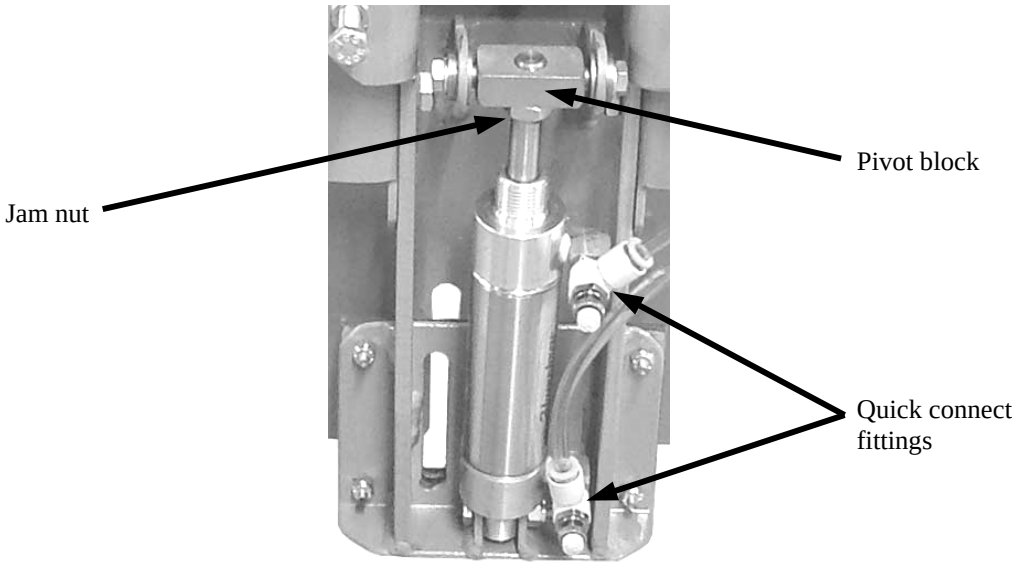


Figure 7-9. Bag Clamp Cylinder (1 of 2 shown)

7.3.5.2 Bag Clamp Cylinder (V-Type Bag Clamp) Installation

1. Lay the new bag clamp cylinder next to the old cylinder.
2. Remove the air fittings from the old cylinder and transfer them to the new cylinder. Make sure that the fitting on the rod end of the old cylinder is installed in the rod end of the new cylinder. Refer to 7.3.14 Pneumatic Quick Connect Fitting Replacement.
3. Set the jam nut on the new cylinder to match the position of the jam nut on the old cylinder.
4. Thread the cylinder rod into the pivot block until the jam nut just touches the pivot block. Then back the cylinder rod off about ¼ turn.
5. Pivot the cylinder end into the cylinder mounting bracket on the bag clamp arm.
6. Insert the cylinder to bag clamp mount bolt.
7. Install and tighten the nut on the cylinder to bag clamp mount bolt.
8. Connect the air supply lines to the cylinder quick connect fittings.
9. Connect the main electrical and pneumatic connections.
10. Turn the VN Series on and test for proper operation.

7.3.6 Bag Clamp Pad Mount (V-Type Bag Clamp) Replacement

If one of the bag clamp pad mounts becomes damaged, use the steps below to replace it.

7.3.6.1 Bag Clamp Pad Mount (V-Type Bag Clamp) Removal

1. Turn the VN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Remove the bag clamp cylinder. Refer to 7.3.5 Bag Clamp (V-Type Bag Clamp) Cylinder Replacement.
4. Remove the two bag clamp pad mount to spout mounting bolts.
5. Remove the bag clamp pad arm.
6. If the arm is being replaced, remove the bag clamp pad from the mount. Refer to 7.3.4 Bag Clamp Pad (V-Type Bag Clamp) Replacement.

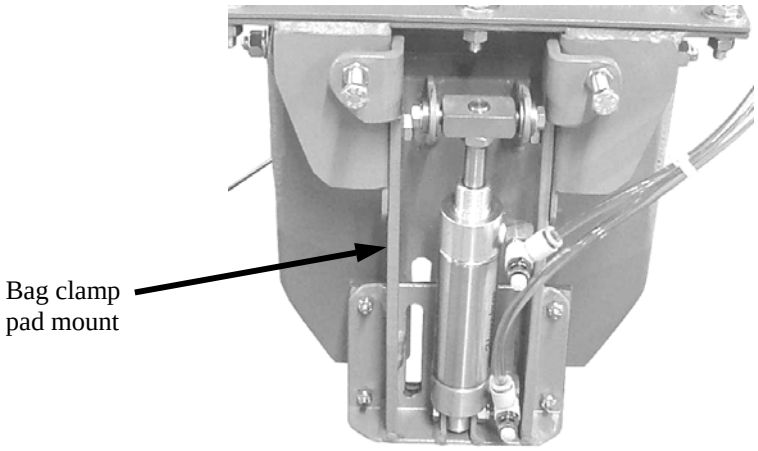


Figure 7-10. Bag Clamp Pad Arm

7.3.6.2 Bag Clamp Pad Mount (V-Type Bag Clamp) Installation

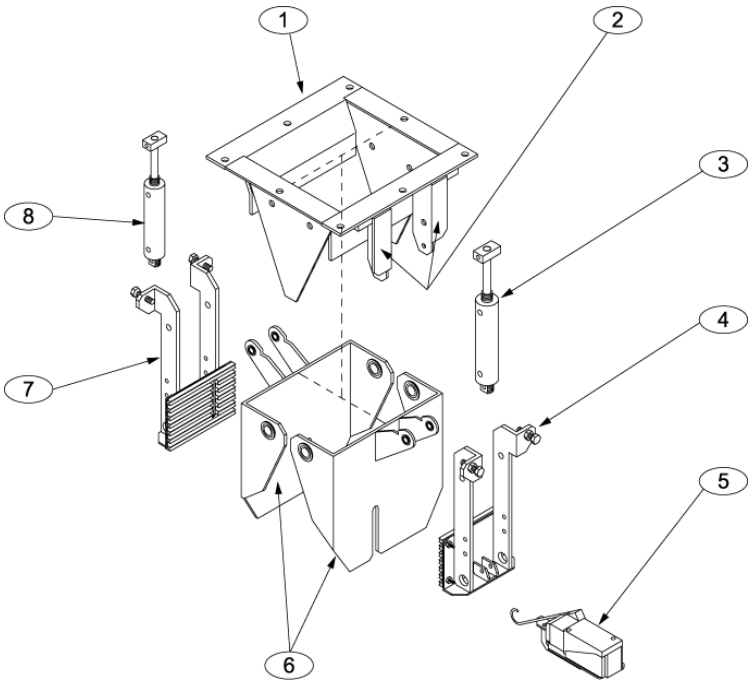
1. If a new bag clamp mount is being installed, install a new bag clamp pad. Refer to 7.3.4 Bag Clamp Pad (V-Type Bag Clamp) Replacement.
2. Position the bag clamp pad mount so the mounting holes are lined up with the mounting holes in the spout.
3. Install and tighten the mounting bolts.
4. Install the bag clamp cylinder. Refer to 7.3.5 Bag Clamp (V-Type Bag Clamp)Cylinder Replacement.
5. Connect the main electrical and pneumatic connections.
6. Turn the VN Series on and test for proper operation.

7.3.7 Bag Clamp Arm (V-Type Bag Clamp) Replacement

If one of the bag clamp pad arms becomes damaged, use the steps below to replace it.

7.3.7.1 Bag Clamp Arm (V-Type Bag Clamp) Removal

1. Turn the VN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Remove the bag clamp cylinder that is connected to the arm being replaced. 7.3.5 Bag Clamp (V-Type Bag Clamp) Cylinder Replacement.
4. Remove the nuts, washers, and bolts that secure the bag clamp arm to the spout.
5. Lower the bag clamp arm away from the spout.



Item #	Description	Item #	Description
1	Spout	5	Bag Clamp Actuator Switch
2	Bag Clamp Pad Arm Mounts	6	Bag Clamp Arms
3	Bag Clamp Cylinder	7	Bag Clamp Pad Arm
4	Bag Clamp Pad Arm	8	Bag Clamp Cylinder

Figure 7-11. Spout Components – Exploded View

7.3.7.2 Bag Clamp Arm (V-Type Bag Clamp) Installation

1. Raise the bag clamp arm into position.
2. Install the bag clamp arm pivot bolts, washers, and nuts. Tighten the nuts on the bolts.
3. Install the bag clamp cylinder that is connected to the arm being replaced. Refer to 7.3.5 Bag Clamp (V-Type Bag Clamp) Cylinder Replacement.
4. Connect the main electrical and pneumatic connections.
5. Turn the VN Series on and test for proper operation.

7.3.8 Bag Clamp Arm Bearing (V-Type Bag Clamp) Replacement

In the event that one or both of the bearings mounted in the main gate becomes worn so that it no longer allows free movement, follow the procedures below to replace it.

7.3.8.1 Bag Clamp Arm Bearing (V-Type Bag Clamp) Removal

1. Turn the VN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Remove the bag clamp cylinder. Refer to 7.3.5 Bag Clamp (V-Type Bag Clamp) Cylinder Replacement.
4. Remove the bag clamp arm. Refer to 7.3.7 Bag Clamp Arm (V-Type Bag Clamp) Replacement.
5. Stand the bag clamp arm on its side so that the bearing being replaced is located at the top.
6. Heat the area immediately surrounding the bearing being replaced to approximately 480°F (250°C).

7. Place a clean metal container against the main gate, just below the bearing being replaced.
8. Use a screwdriver or punch to push the bearing out of the hole into the metal catch container.
9. Repeat this procedure for all bearings that need replaced.

7.3.8.2 Bag Clamp Arm Bearing (V-Type Bag Clamp) Installation

1. Position the bag clamp arm so that the metal surfaces with the bearing holes are vertical.
2. Apply a small bead of LOCTITE® 680 Retaining compound around the outer surface of the bearing.

CAUTION Do not allow any of the LOCTITE® 680 to penetrate into the actual bearing. This would likely cause the bearing to seize, or at the very least would adversely affect the operation of the bearing.

3. Insert the bearing into the bearing hole in the main gate.
4. The bearing is slightly thicker than the main gate itself. Center the bearing in the hole.
5. Repeat Steps 1, 2, and 3 until all of the bearings have been installed.
6. Set the main gate aside for a couple of minutes to allow the LOCTITE® 680 to setup.
7. Install the bag clamp arm. Refer to 7.3.7 Bag Clamp Arm (V-Type Bag Clamp) Replacement.
8. Install the bag clamp cylinder. Refer to 7.3.5 Bag Clamp (V-Type Bag Clamp) Cylinder Replacement.
9. Connect the main electrical and pneumatic connections.
10. Turn the VN Series on and test for proper operation.

7.3.9 Spout (V-Type Bag Clamp) Replacement

If the spout becomes damaged or worn, use the following steps to replace it.

7.3.9.1 Spout (V-Type Bag Clamp) Removal

1. Turn the VN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Remove the bag clamp cylinders. Refer to 7.3.5 Bag Clamp (V-Type Bag Clamp) Cylinder Replacement.
4. Remove the bag clamp arms. Refer to 7.3.7 Bag Clamp Arm (V-Type Bag Clamp) Replacement.
5. Loosen the nuts on the mounting bolts around the flange of the spout. Remove all of the nuts, washers and bolts from the flange, except for the ones on two opposite corners of the spout.
6. While supporting the spout, remove the remaining nuts, washers and bolts from the flange.
7. Lower the spout.

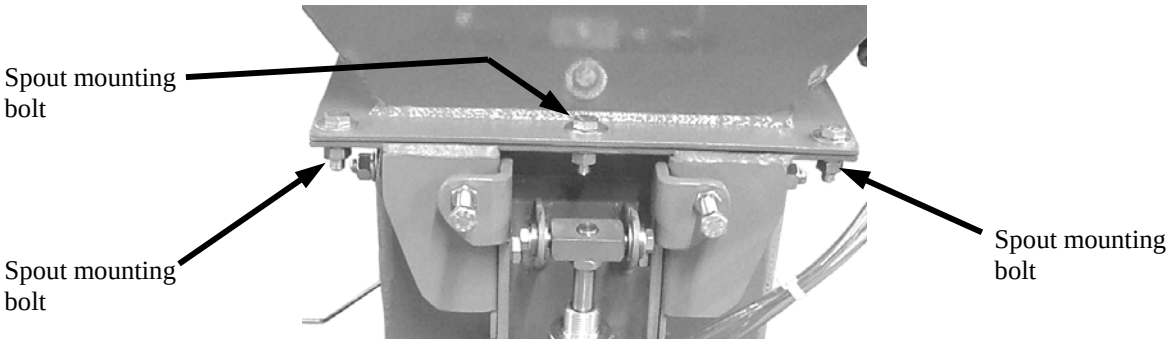


Figure 7-12. Spout Mounting Bolts

7.3.9.2 Spout (V-Type Bag Clamp) Installation

1. Position and support the spout.
2. Install a flat washer on each of the mounting bolts.
3. Install two mounting bolt, from the top, through the flange on the cabinet and spout on opposite corners.
4. Install the lock washer and nut on the two bolts. Do not tighten at this time.
5. Install the remaining bolts, from the top, through the flange on the cabinet and spout.
6. Install the lock washers and nuts on each of the bolts.
7. Tighten each bolt/nut a little at a time, working around the perimeter until all bolts/nuts are tight.
8. Install the bag clamp arms. Refer to 7.3.7 Bag Clamp Arm (V-Type Bag Clamp) Replacement.
9. Install the bag clamp cylinders. Refer to 7.3.5 Bag Clamp (V-Type Bag Clamp) Cylinder Replacement.
10. Connect the main electrical and pneumatic connections.
11. Turn the VN Series on and test for proper operation.

7.3.10 Inflatable Bladder Replacement

On VN Series machines that are equipped with an inflatable bladder type of bag clamp, use the steps below to replace a damaged inflatable bladder.

7.3.10.1 Inflatable Bladder Removal

1. Turn the VN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Label and disconnect the air supply line from the quick connect fitting on the spout.
4. Fold the flap up to expose the tabs and setscrews on the top compression ring.

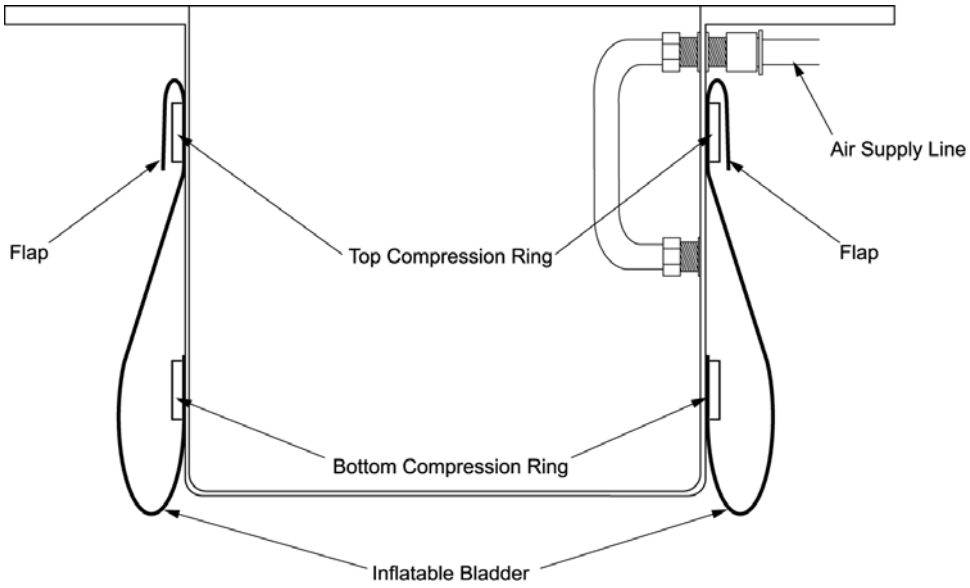


Figure 7-13. Section View of Open Mouth Bag Spout and Inflatable Bladder

5. Using C-clamp style locking pliers, apply pressure to the tabs of the top compression ring.

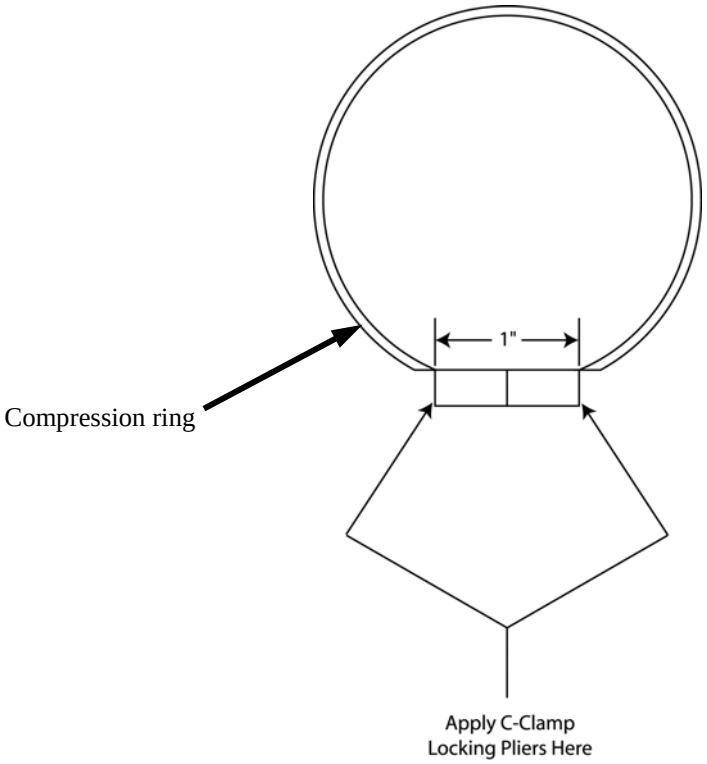


Figure 7-14. Inflatable Bladder Compression Ring

6. Remove the setscrews from the top compression ring.
7. Remove the C-clamp style locking pliers.
8. Slide the top compression ring off of the spout
9. Pull the bladder straight down to expose the second compression ring.
10. Using C-clamp style locking pliers, apply pressure to the tabs on the bottom compression ring.

11. Remove the setscrews from the bottom compression ring.
12. Remove the C-clamp style locking pliers.
13. Slide the bottom compression ring off of the spout.

    Note: *The two compression rings are different sizes and cannot be interchanged.*

    Note: *Make note of how the bladder is positioned. The new bladder will need to be positioned in the same manner as the one that is being removed.*

14. Remove the bladder.
15. Inspect the compression rings for damage or wear. If they are damaged or worn, discard them and install new ones with the new bladder.

7.3.10.2 Inflatable Bladder Installation

1. Turn the new bladder inside out.
2. Slide the new inflatable bladder on to the spout. Position it on the spout in the same position as the old bladder.

   Note: *The two compression rings are different sizes and cannot be interchanged.*

3. Position the bottom compression ring.
4. Using C-clamp style locking pliers, apply pressure to the tabs on the bottom compression ring.
5. Install and tighten the setscrews for the bottom compression ring.
6. Remove the C-clamp style locking pliers.
7. Grasp the edge of the bladder at the bottom. Roll the edge outward and upward, creating a flap. This motion will begin the process of turning the bladder right side out.

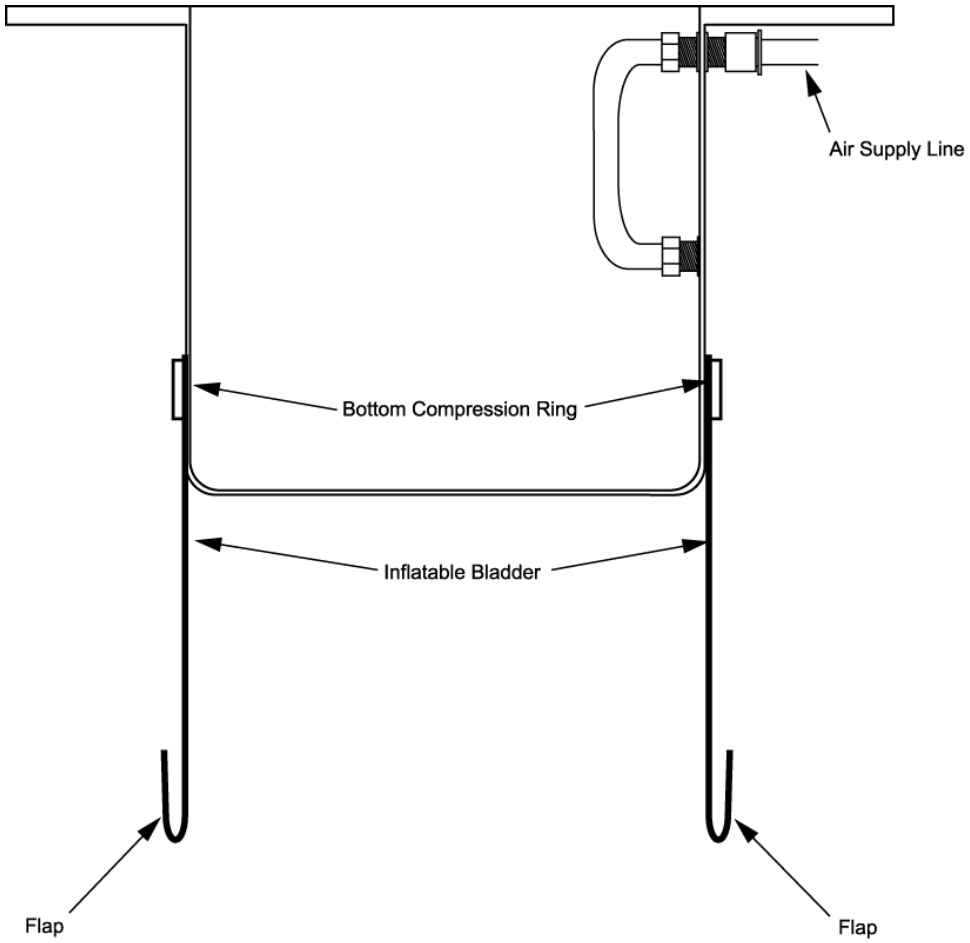


Figure 7-15. Creating the Flap

8. Using the flap, pull the bladder up to the top of the spout and roll the edge outward and downward, creating a new flap.

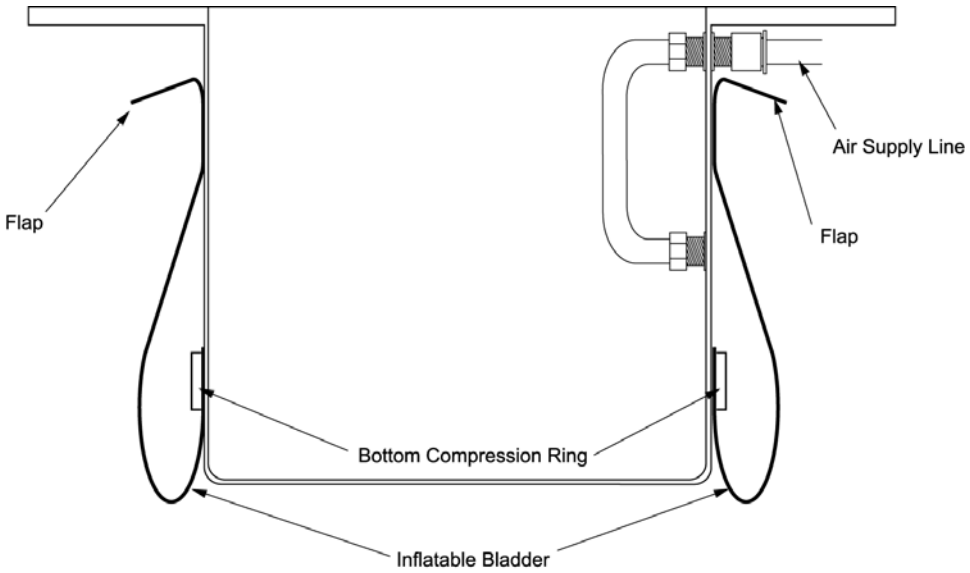


Figure 7-16. Pulling the Bladder Up, and Creating the Upper Flap

9. Slide the top compression ring into position.
10. Using C-clamp style locking pliers, apply pressure to the tabs on the top compression ring.
11. Install and tighten the setscrews for the top compression ring.
12. Remove the C-clamp style locking pliers.
13. Pull the flap down to cover the top compression ring.
14. Install the air supply line into the quick connect fitting.
15. Connect the main electrical and pneumatic connections.
16. Turn the VN Series on and test the bladder for proper operation.

7.3.11 MAC Valve Replacement

In the event that a MAC valve becomes damaged, or fails to function, or develops a leak, follow the procedure below to replace the MAC valve.

7.3.11.1 MAC Valve Removal

1. Turn the VN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Disconnect the air line from the quick connect fitting on the MAC valve.
4. Remove the four mounting screws.
5. Unplug and remove the MAC valve.

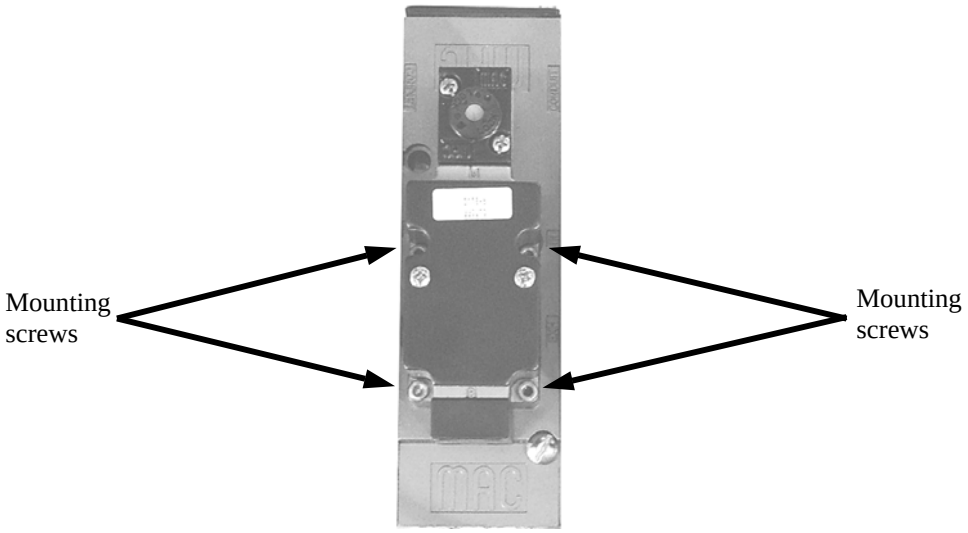


Figure 7-17. MAC Valve Solenoid Mounting Screws

7.3.11.2 MAC Valve Installation

1. Position the valve gasket securely in the groove in the valve base.
2. Position the new MAC valve and plug it in.

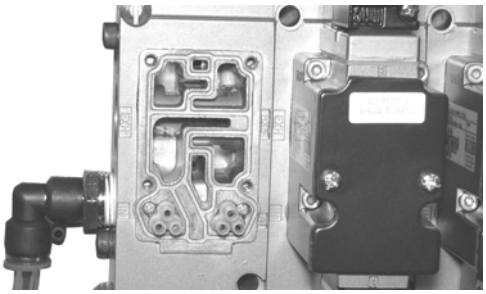


Figure 7-18. MAC Valve (Solenoid Removed)

3. Install and tighten the four mounting screws.
4. Connect the air line to the quick connect fitting on the MAC valve.
5. Connect the main electrical and pneumatic connections.
6. Turn the VN Series on and test for proper operation.

7.3.12 Bag Clamp Actuator Switch Replacement

If the bag clamp actuator switch fails to function and troubleshooting techniques have determined that the switch must be replaced, use the following steps to replace the switch.

7.3.12.1 Bag Clamp Actuator Switch Removal

1. Turn the VN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Open the control box.
4. Trace the cable from the bag clamp actuator switch to the point where it is connected to the controller.
5. Label the wires to indicate how they were connected.
6. Disconnect the switch cable from the controller.
7. Pull the cable free from the control box.
8. Remove any tie wraps that may secure the cable to the VN Series.
9. Pull the cable free of the machine, all the way up to the bag clamp actuator switch.
10. Remove the mounting screws that mount the bag clamp actuator switch to the mounting bracket.
11. Remove the bag clamp actuator switch.

7.3.12.2 Bag Clamp Actuator Switch Installation

1. Position the bag clamp actuator switch so that the mounting holes in the bracket are aligned with the mounting holes in the bag clamp actuator switch.
2. Insert and tighten the mounting screws.
3. Route the bag clamp actuator switch cable to the control box in the same manner as the cable from the bag clamp actuator switch that was removed.
4. Insert the end of the cable through the grommet into the control box.
5. Connect the wires to the controller in the same fashion as the connections from the bag clamp actuator switch that was installed previously.
6. Close the control box.
7. Secure the bag clamp actuator switch cable to the frame of the VN Series using tie straps.
8. Connect the main electrical and pneumatic connections.
9. Turn the VN Series on and test for proper operation.

7.3.13 Bag In Place Switch Replacement

If the bag in place switch fails to function and troubleshooting techniques have determined that the switch must be replaced, use the following steps to replace the switch.

7.3.13.1 Bag In Place Switch Removal

1. Turn the VN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Open the control box.
4. Trace the cable from the bag in place switch to the point where it is connected to the controller.
5. Label the wires to indicate how they were connected.
6. Disconnect the bag in place switch cable from the controller.
7. Pull the cable free from the control box.
8. Remove any tie wraps that may secure the cable to the VN Series.
9. Pull the cable free of the machine, all the way up to the bag in place switch.
10. Remove the mounting screws that mount the bag in place switch to the mounting bracket.
11. Remove the bag in place switch.

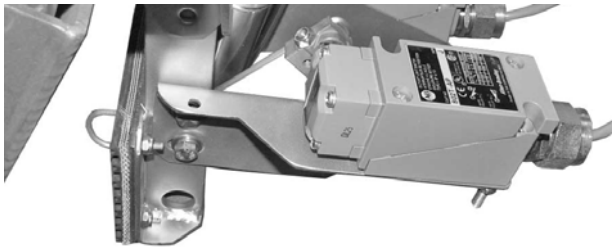


Figure 7-19. Bag In Place Switch

7.3.13.2 Bag In Place Switch Installation

1. Position the bag in place switch so that the mounting holes in the bracket are aligned with the mounting holes in the bag in place switch.
2. Insert and tighten the mounting screws.
3. Route the switch cable to the control box in the same manner as the cable from the bag in place switch that was removed.
4. Insert the end of the cable through the grommet into the control box.
5. Connect the wires to the controller in the same fashion as the connections from the bag in place switch that was installed previously.
6. Close the control box.
7. Secure the bag in place switch cable to the frame of the VN Series using tie straps.
8. Connect the main electrical and pneumatic connections.
9. Turn the VN Series on and test for proper operation.

7.3.14 Pneumatic Quick Connect Fitting Replacement

In the event that a quick connect fitting becomes damaged and requires replacement, use the following procedures to replace the quick connect fitting.

7.3.14.1 Pneumatic Quick Connect Fitting Removal

1. Turn the VN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Disconnect the air supply line from the fitting by pressing in on the collar while pulling out on the air supply line.
4. Using a wrench, unscrew the fitting.

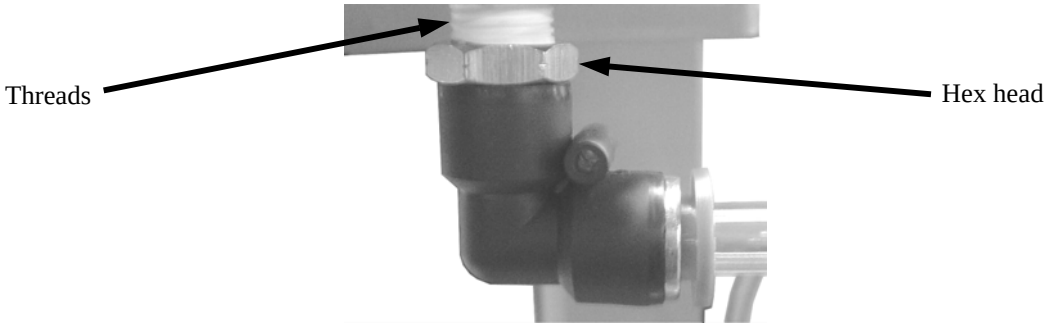


Figure 7-20. Air Supply Fitting

7.3.14.2 Pneumatic Quick Connect Fitting Installation

1. Using Teflon® tape, wrap the threads of the new fitting, starting at the bottom of the thread working toward the hex head in the same direction as the threads.
2. Screw the new fitting into the threads and use a wrench to carefully tighten the fitting.

CAUTION Over tightening the fitting can damage the fitting, or the component that it is being threaded into.

3. Reconnect the air supply line to the fitting.
4. Reconnect the main pneumatic connection and check for any leaks. If a leak is found, disconnect the main pneumatic connection and then disconnect/reconnect the air connections, then reconnect the main pneumatic connection. Repeat as necessary, until no leaks are present.
5. Reconnect the main electrical connection.
6. Turn the VN Series on and test for proper operation.

7.3.15 T3000 Interface Card Replacement

If the T3000 Interface Card becomes damaged or fails to function, use the following procedures to remove it and install a new one.

ESD NOTICE

To protect against ESD damage to the T3000 Interface Card, follow Standard ESD Prevention Procedures. Failure to use recommended protective measures could result in permanent equipment damage, either immediate or latent, when handling components.

7.3.15.1 T3000 Interface Card Removal

1. Turn the VN Series off and disconnect it from its power source.
2. Open the control box.
3. Label each wire for easy identification.
4. Disconnect each wire from the module.
5. While holding the module, remove the mounting screws and the module.

7.3.15.2 T3000 Interface Card Installation

1. Hold the new module in position and install the mounting screws.
2. Reconnect each wire to the module. Take care to be sure that each wire is connected to the appropriate terminal.
3. Close the control box.
4. Reconnect the VN Series power cords to their respective power sources.
5. Turn the VN Series on and check for proper operation.

7.3.16 Harding Summing Board Replacement

If the Hardy Summing Board, used with the T4000 control panel, becomes damaged or fails to function, use the following procedures to remove it and install a new one.

ESD NOTICE

To protect against ESD damage to the Hardy Summing Board, follow Standard ESD Prevention Procedures. Failure to use recommended protective measures could result in permanent equipment damage, either immediate or latent, when handling components.

7.3.16.1 Harding Summing Board Removal

1. Turn the VN Series off and disconnect it from its power source.
2. Open the control box.
3. Label each wire for easy identification.
4. Disconnect each wire from the Hardy Summing Board.
5. While holding the module, remove the mounting screws and the module.

7.3.16.2 Harding Summing Board Installation

1. Hold the new Hardy Summing Board in position and install the mounting screws.
2. Reconnect each wire to the Hardy Summing Board. Take care to be sure that each wire is connected to the appropriate terminal.
3. Close the control box.
4. Reconnect the VN Series power cords to their respective power sources.
5. Turn the VN Series on and check for proper operation.

Glossary

Term	Definition
AC	Alternating Current
Bag clamp	A set of two bag clamps are applied and released via pneumatic cylinders. When applied, the two bag clamps hold the bag in place while it is being filled.
Bag clamp actuator switch	The operator will trip the bale on this switch to apply the bag clamps.
Bag clamp pad	One rubberized pad is mounted on each bag clamp arm. These pads provide the grip required to hold a bag while it is being filled.
Bagging cycle	A series of functions that describe the packaging process, from beginning to end, for one package of product.
Bag in place switches	A pair of switches that are used to determine whether a bag is in place and properly positioned and ready to receive product.
Balancing load cells	The process of combining the inputs from each load cell and producing a single output to the control panel.
Cabinet	The main structure of the VN Series. Serves as the backbone of the machine.
Calibration	The process of adjusting the weighing system to make sure that the load cells matches the weight of the known weight.
Checkweigh	A function that the operator can use to check the weight of the product prior to the product being released from the weigh bucket.
Component	An item of hardware as commonly supplied complete by manufacturers.
Counter	A function of the control system that counts how many specific events occur to complete a process. For example, if the desired package weight is higher than the capacity of the weigh bucket, multiple cycles of filling and emptying the weigh bucket must occur. The counter will keep track of the cycles.
Cubic Feet/Minute (CFM)	A unit of measure that is used to describe the amount of compressed air that is used by a machine.
Cutoff gate	This gate is attached to the end of the vibratory feeder and actuated by a pneumatic cylinder. When open, it allows the product to flow off of the vibratory feeder.
DC	Direct Current
De-energize	To deprive an electro-receptive device of its operating current.
DROP button	A button on the control panel that allows the operator to force the bag clamps to release.
Dry cycle	The process of checking the operation of the machine components without running product through the machine.
DUMP button	A button on the control panel that allows the operator to force the dump gates on the weigh bucket open.
Dump gates	Two metal gates mounted on the bottom of the weigh bucket. These gates seal the bottom of the weigh bucket when the gates are closed. The gates are opened to dump the product into the bag.
ESD	Electrostatic Discharge. ESD can damage electronic components.
Fill cycle	The process of filling one bag.
Flow gate	This gate is used to control the depth of product in the pan of the vibratory feeder. It is adjusted manually.
FRL	Filter/Regulator/Lubricator assembly. This device filters incoming compressed air, regulates the pressure, and introduces a lubricant to protect downstream pneumatic components from wear.
Ground	Ground (Electrical). A conducting connection, whether intentional or accidental, between an electrical circuit or equipment and the earth, or some other conducting body at a reference potential.
kg	Kilogram
lb or lbs	Pound or pounds
Load cell	Two load cells are used to determine the weight of the product in the weigh bucket.
MAC valve	A device that combines an electric solenoid and a pneumatic valve. Voltage is applied or removed from the solenoid to cause the pneumatic valve to move. Used to control the pneumatic cylinders.

Term	Definition
Pivot block	Threads on to the end of a pneumatic cylinder rod and is connected to a bag clamp pad arm. It allows the pneumatic cylinder to pivot slightly as it applies the bag clamp pad.
Power supply	Converts incoming 120VAC power in a usable power for the control components.
Product	Refers to the material that is being packaged by the machine.
Programmable Logic Controller (PLC)	A microprocessor-based industrial control system. It receives inputs from devices, such as switches and control buttons. The internal processor uses a program to analyze the inputs and will drive outputs based on the results.
Spout	The mounting point for the bag clamp mechanism. The bags are placed on the spout for filling.
Spout transition	A funnel shaped device that mounts to the bottom of the cabinet. It serves as the mounting point for the spout. As product falls from the weigh bucket, this device guides the product to the spout.
SP1	Setpoint 1. This is the dribble point. This is the point where the machine stops filling the weigh bucket at the bulk rate and starts filling it at the dribble rate.
SP2	Setpoint 2. This is the cutoff point. This is the point where the machine stops filling the weigh bucket. SP2 is typically set slightly below the target weight.
Surge	A sudden rise of current or voltage.
Surge Hopper	A reservoir where product is stored for packaging.
T3000	Optional control panel that is used to control most of the functions of the VN Series.
T4000	Standard control panel that is used to control most of the functions of the VN Series.
Timer	A function of the control system that forces a specific amount of delay between specific events or functions.
Vibratory feeder	A product feed device that uses vibration to move the product from the supply hopper to the weigh pan via a feeder pan.
Weigh bucket	A metal vessel that is used to catch and the product falling from the vibratory feeder for weighing. Once the product is weighed, the dump gates open and drop the product from the weigh bucket into the bag.

Index

Adjusting Air Flow, ... 7-3
Adjusting the Flow Gate, ... 7-3
Air Pressure Adjustments, ... 7-1
Allen-Bradley MicroLogix 1000, ... 4-7
Bag Clamp, ... 1-8
Bag Clamp (V-Type Bag Clamp) Cylinder Replacement, ... 7-8
Bag Clamp Actuator Switch Replacement, ... 7-18
Bag Clamp Actuator Switches, ... 1-9
Bag Clamp Arm (V-Type Bag Clamp) Replacement, ... 7-10
Bag Clamp Arm Bearing Replacement, ... 7-11
Bag Clamp Pad (V-Type Bag Clamp) Replacement, ... 7-8
Bag Clamp Pad Arm (V-Type Bag Clamp) Replacement, ... 7-9
Bag In Place Switch, ... 1-10
Bag In Place Switch Replacement, ... 7-19
Basic Fill Process, ... 4-2
Cabinet Assembly, ... 1-3
Calibrating the Optional T3000 Controller, ... 3-13
Calibrating the T4000 Controller, ... 3-10
Calibration, ... 3-10
Check Calibration, ... 5-1
Cleaning, ... 5-1
Control Box With Optional T3000 Control Panel, ... 1-15
Control Box With T3000 Control Panel, ... 4-6
Control Box with T4000 Control Panel, ... 4-4
Control Panel User Manual/Guide, ... 7-1
Custom Features, ... 7-1
Cutoff Gate, ... 1-5
Cutoff Gate Adjustment, ... 7-2
Daily Maintenance Procedures, ... 5-1
Determining Hopper Size, ... 3-1
Determining The Height Of The VN Series Feeder System, ... 3-1
Dry Cycle, ... 3-10
Dump Gate Cylinder Replacement, ... 7-5
Dump Gate Cylinders, ... 1-8
Dump Gate Replacement, ... 7-6
Dump Gates, ... 1-7
Electrical Drawings, ... 7-1
Electrical Requirements, ... 1-1
Electro Static Discharge, ... ii
Electro-static Discharge (ESD) Prevention Procedures, ... ii
Establishing Security Settings, ... 3-6
Field Service, ... iii
Filling the Bag, ... 4-3
Filling the Weigh Bucket, ... 4-2
Filter/Regulator/Lubricator (FRL) Assembly, ... 1-11
Flow Gate, ... 1-5
General Fill Cycle Information, ... 4-1
Glossary, ... 7-1
Harding Summing Board Replacement, ... 7-21
Inflatable Bladder Replacement, ... 7-13
Initial Setup, ... 4-9
Load Cell Replacement, ... 7-4
Load Cells, ... 1-5
MAC Valve Replacement, ... 7-17
MAC Valves, ... 1-11
Machine Controls, ... 1-12
Major Systems and Components, ... 1-2
Making Electrical Connections, ... 3-4
Making Network Connections (T3000 Only), ... 3-5
Making Pneumatic Connections, ... 3-5
Mechanical Controls, ... 4-4
Mechanical Drawings, ... 7-1
Mechanical Setup, ... 3-1
Monthly Maintenance, ... 5-1
Mounting the VN Series, ... 3-2
Operation, ... 4-1
Operational Controls, ... 4-4
Optional Inflatable Bladder Bag Clamp, ... 1-9
Optional T3000 Electronic Control Components, ... 1-17
Pneumatic Component Lubrication Requirements, ... 3-5
Pneumatic Lubrication Requirements, ... 1-1
Pneumatic Quick Connect Fitting Replacement, ... 7-20
Pneumatic Requirements, ... 1-1
Preventive Maintenance, ... 5-1
Product Description, ... 1-1
Putting a Bag on the Bag Spout, ... 4-3

PV300 Control Panel, ... 4-7
PV300 Menus, ... 4-8
Receiving Equipment, ... 2-1
Repair and Adjustment, ... 7-1
Safety Procedures, ... 7-1
Setting Up a VN Series With T3000 Controls to Fill, ... 4-9
Setting Up a VN Series With T4000 Controls to Fill, ... 4-9
Setup/Installation, ... 3-1
Spare Parts, ... 7-1
Spout (V-Type Bag Clamp) Replacement, ... 7-12
Spout Assembly, ... 1-8
Spout Transition, ... 1-10
Standard Control Box With T4000 Control Panel, ... 1-12
Standard Electronic Control Components, ... 1-14
Standard V-Type Bag Clamps, ... 1-8
Starting the Unit, ... 4-11
System Adjustments, ... 7-1
System Alarms, ... 6-4
System Repairs, ... 7-4
T3000 Alarms, ... 6-5
T3000 Interface Card Replacement, ... 7-21
T3000 Security Settings, ... 3-9
T4000 Alarms, ... 6-4
T4000 Security Settings, ... 3-6
Timer and Counter Programming, ... 3-15
Trouble Symptoms, ... 6-1
Troubleshooting, ... 6-1
Troubleshooting Process, ... 6-1
Typical Fill Cycle, ... 4-2
Uncrating the Equipment, ... 2-1
Vibratory Feeder, ... 1-4
Warranty, ... iii
Weigh Bucket Assembly, ... 1-6

Appendix A
Safety Procedures

- General safety precautions must be observed during all phases of operation, service and repair of the VN Series. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of the VN Series.
- The manufacturer assumes no liability for customer's failure to comply with the following requirements:
- Qualified technicians and maintenance personnel should service the equipment described in this manual.
- Do not attempt internal service or adjustments unless another person, capable of rendering first aid and resuscitation, is available.
- Do not substitute parts or modify equipment. This practice could, in some cases, introduce the danger of additional hazards.
- The VN Series contains some electrostatic-sensitive components. Therefore, always ground yourself with a proper wrist strap before handling any modules or printed circuit boards so that static charges are removed from the person. Use static suppressive packaging to protect electronic assemblies removed from the VN Series.
- Observe all procedural cautions and warnings located on the equipment and throughout this manual.
- Read and follow all instructions
- Follow all warnings and instructions marked on the units and listed in manuals.

This Page Intentionally Left Blank

Appendix B
Spare Parts

Table B-1. VN Series Spare Parts List

	Part Description	Part Number
1	Dump gate (2 required)	60-0680
2	Weigh bucket	60-0678
3	Dump gate cylinder	50-1104
4	Bag clamp cylinder	50-1104
5	Cutoff gate cylinder	50-1163
6	Cutoff gate cylinder rod end	50-7056
7	Cutoff gate	60-0688
8	Cutoff gate arm	WORTZA14
9	Flow gate	CABA3
10	Flow gate shaft	CABA2
11	Load cell (2 required)	50-1544
12	MAC valve	50-1082
13	Bag in place switch (2 required)	50-1017
14	Bag clamp actuator switch	50-1017
15	Vibratory feeder	50-1100
16	Allen-Bradley MicroLogix™ PLC	50-1909
17	24 VDC Power Supply	50-7629
18	ECT-157 Interface Board (Used with T3000 Control Panel)	53-2077
19	FMC Syntron Vibrator Control Module (Used with T3000 Control Panel)	No Part #
20	Vibrator Control Module (Used with Analog Control Panel)	50-1019
21		
22		
23		
24		
25		

This Page Intentionally Left Blank

Appendix C
Mechanical Drawings

Table C-1. VN Series Mechanical Drawings

	Drawing Title	Drawing Number
1	Isometric View of VN Series	TEVN ISO-00
2	Analog Control Box, Pedestal Mount – External View	30158-1-401-00
3	Analog Control Box, Pedestal Mount – Internal View	30158-1-402-00
4	T3000 Control Box, Pedestal Mount – External View	30798-1-401-00
5	T3000 Control Box, Pedestal Mount – Internal View	30798-1-402-00
6	Weigh Bucket – Isometric View	BUCKET ISO-00
7	Callout1	CALLOUT1
8	Callout2	CALLOUT2
9	Cutoff Gate Mechanism – Isometric View	GATE CALLOUT
10	V-Style Bag Clamp Spout – Isometric View	ISTVA
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

This Page Intentionally Left Blank

Appendix D
Electrical Drawings

Table D-1. VN Series Electrical Drawings

	Drawing Title	Drawing Number
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

This Page Intentionally Left Blank

Appendix E
Control Panel User Manual/Guide

This Page Intentionally Left Blank

This unit was ordered with the base analog control set, thus the control panel user manual/guide is not needed and not included.

This Page Intentionally Left Blank

Appendix F
Custom Features

The documents included in Appendix F will provide information regarding any custom features that were ordered and included in the equipment purchase.

This Page Intentionally Left Blank

The equipment that accompanies this manual was not ordered with any custom features, thus no custom documentation is included.

This Page Intentionally Left Blank